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ABSTRACT

Compared in a 2-year study were four establishment of fluency programs in a public school setting with 40 7- to 16-year-old children who stuttered. The programs included programmed traditional (PT), delayed auditory feedback (DAF), pause (P), and gradual increase in length and complexity of utterance (GILCU). During the first year, eight speech clinicians ran one of the four establishment programs on two Ss each. The findings indicated that all four programs produced improved speech fluency, but that two of the programs (GILCU and DAF) were more efficient. During the second year 12 different clinicians in three different public schools administered either the GILCU or the DAF on two Ss each. The two programs were found to be comparable, except that DAF was more effective for more severe stutterers and GILCU provided for better fluency generalization. The project demonstrated that all four establishment programs were effective and could be run by trained and supervised speech clinicians in the public school setting. (Author/CL)

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Final Report

Project No. 232456
Grant No. OEG-O-72-4422

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PROGRAMMED STUTTERING THERAPY FOR CHILDREN

September, 1974

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

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ABSTRACT

This was a two-year project to compare 4 different establishment of fluency programs (PT, DAF, P, and GILCU) in the public school setting with school-aged (7-16 years) children who stuttered. There were transfer and maintenance phases. A number of tests and interviews, including speech samples in the home and school, were taken before and after various program phases.

During the first year, 8 speech clinicians ran one of the 4 establishment programs on 2 subjects each for a total of 16 subjects, 4 on each program. The findings were that all 4 of the programs produced improved speech fluency, but 2 of the programs (GILCU and DAF) were more efficient.

During the second year 12 different clinicians, 4 in each of 3 different public school sites ran either GILCU or DAF on 2 subjects each for a total of 24 subjects. The findings were that the 2 programs were generally comparable except that DAF was more effective for more severe stutterers and GILCU provided for better generalization of fluency.

The project demonstrated that all 4 establishment programs were effective (40 subjects) and could be run by speech clinicians (20) in the public school setting (4) provided that the clinicians received adequate training and supervision and ran the programs correctly.

Final Report

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Programmed Stuttering Therapy for Children

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Behavioral Sciences Institute

Carmel, California

September, 1974

The research reported herein was performed pursuant to a grant with the Office of Education, Department of Health, Education and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgement in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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Preface

This project is one of the many to demonstrate the effectiveness of programmed instruction with people who stutter. It is similar to and drew information from the work of George Shames at the University of Pittsburgh, Richard Martin at the University of Minnesota, William Perkins at the University of Southern California, Don Mowrer at Arizona State University and Israel Goldiamond at the University of Chicago.

Burl Gray of Behavioral Sciences Institute served as the on-site project consultant and offered many invaluable contributions to the project. George Shames and Richard Martin served as off-site project consultants and their help is acknowledged.

Dr. Sam Kier, Director of Special Education of the Monterey Unified School District, Monterey, California, and his 8 speech clinicians: Connie Mitchell, Barbara Verbonich, Marion Ferrante, Joe Mahler, Sharon Middleton, Linda Maffei, Gerry Irvin and Anita Motta provided the setting, subjects and clinicians for the first year of the project. Thank you.

During the second year, three other California school districts participated. We wish to thank them. They were: Palo Alto, Peggy Tuder, Supervisor and 4 speech clinicians; Jean Sidwell, Jane Stocklin, Gloria McConnell; San Jose, Bernita Gross, Coordinator and 4 speech clinicians; Barbara Ellingson, Florence Goehler, Annette Sobi, and Edna McPherson; and San Luis Obisipo, Bill Kent, Coordinator, and 4 speech clinicians; Kathy High, Doreen Smith, Diane Adorno and Jackie Steele.

Finally, we wish to acknowledge the cooperation and help of the 40 plus subjects, their parents and teachers.

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INTRODUCTION YEAR I, 1972-73

There are a number of different operant fluency programs which have been demonstrated to produce fluent speech in people who stutter (Ingham and Andrews, 1973; Ryan, 1971; Martin, 1968; Goldiamond, 1965). A few of these programs have been used with children. There are at least four identifiable procedures commonly described in the literature: 1) a procedure using cancellations, pullouts and prolongations; 2) a procedure employing delayed auditory feedback to produce a slow, prolonged, fluent speech pattern which is shaped toward normal speech; 3) a time-out or punishment procedure which employs a time-out from talking contingent on each stuttered word and 4) a procedure which gradually increases the length and complexity of utterance starting with single words and working up to several minutes of talking. All of these procedures have been reported to reduce the frequency of stuttering and increase fluent talking. There have been no comparative studies. Most of the studies of these programs have taken place in university or laboratory-like settings.

Project Objectives

The general objectives of this project for 1972-73 were to: 1) use four different programmed therapy procedures with children who stutter; 2) contrast the effectiveness of these programs in establishing, transferring, and maintaining fluent speech and 3) demonstrate that these programs can be carried out successfully in the public school setting.

The specific objectives of the first year were to: 1) refine the programs including both the formats in which they were written and certain operational characteristics; 2) develop a Natural Speech Sample process to collect samples of the subjects' spontaneous speech in the home and school settings; 3) collect data on the programs with the possible outcome that one or more of the programs would not be tested during the second year and 4) collect data on the clinicians' ability to carry out the programs.

PROCEDURES

Programs

There are three phases of programmed fluency training: Establishment- during which the target is fluent conversation in the presence of the clinician; Transfer - during which the target is fluent speech in a wide variety of settings; and Maintenance - during which the target is the continued demonstration of fluent speech over extended time periods (Ryan, 1970). The Establishment, Transfer and Maintenance programs were put into written script form. There were four Establishment Programs considered in this study. Each of them included reading, monologue and conversation sections. Each program was put in the same written program format with a similar number of series, steps, criterion levels, reinforcement schedules and branching procedures in the

event of problems. Tokens exchangeable for small toys, school supplies or other items were given as reinforcers for emitting desired program responses or for passing steps. A more complete description of each program follows.

The Four Establishment Programs.

1. Programmed Traditional(PT). This program started with 3 identification steps, 2 cancellation steps, 1 pullout step, 1 prolongation step and 1 fluent speaking step for a total of 8 steps. This sequence was repeated for reading, monologue and conversation, yeilding a total of 24 steps. The subjects were given tokens for emitting program responses. The final step in each series was 5 minutes of fluent reading or monologue or conversation. The program had a minimal run time of 111 minutes. This program was based on work by Ryan (1964).

2. Delayed Auditory Feedback(DAF). This program started with a 4-step series to teach a slow, prolonged fluent pattern. This initial series was followed by three 7-step series in reading, monologue and conversation. The 7 steps consisted of gradually decreasing the amount of delayed auditory feedback in 50 milisecond steps from 250 to no delayed auditory feedback. A Delayed Auditory Feedback machine was used to aid in the production of the slow, prolonged pattern. Each series ended with the subject reading or speaking fluently for 5 minutes with no machine support. There was a total of 25 steps. The subjects received tokens for passing steps. The program had a minimal run time of 107 minutes. This program was based on research by Goldiamond (1965) and many others (Ingham and Andrews, 1973). The program was essentially the same one found in Ryan and Van Kirk (1971).

3. Pause (P). This program was composed of steps which started with a 10-second pause and gradually reduced the pause time from 7 to 5 to 3 to 1 second pauses to fluent talking, first in reading, then in monologue and finally in conversation. A signal light box with a small light visible to the subject was used. The light could be set to stay on for from 1-10 seconds. The subject was instructed to remain quiet while the light was on. The final step in each series was 5 minutes of fluent reading, monologue or conversation with no light box used. The subjects received tokens for passing steps. There was a total of 21 steps. The program had a minimal run time of 105 minutes. This program was based on research done by Martin (1968) and Siegel (1970).

4. Gradual Increase in Length and Complexity of Utterance (GILCU). This program consisted of a number of steps starting with 1-word utterances which were gradually increased to 5 minutes of reading or monologue or conversation. The subjects received a token for each correct response which ranged from reading one word fluently to 5 minutes of fluent conversation. There was a total of 60 steps. The minimal run time was 105 minutes. This program was based on early studies by Rickard and Mundy (1965) and Ryan (1971). The program was essentially the same one found in Ryan and Van Kirk (1971).

Preparation of the Establishment Programs.

The four Establishment Programs were put into similar written formats, (see Figure 1), and effort was made to equate them in certain operation characteristics and to highlight or isolate the variables peculiar to a given program. For example, "the minimal run time " (time subject would take if he went through the program perfectly with no stuttered words) was made as equivalent as possible. However, the number of steps varied with the program, e.g., GILCU had three times as many steps as the other three programs because that is a characteristic of GILCU. A list of 18 program variables comparing the four programs is shown in Table 1.

The most difficult variable to equate was criterion (Variable #3). If it was set too high, the subjects would not complete the program. If it was set too low, the subjects would complete the program but not be able to pass the post program criterion test. The PT#1 and the P#3 programs presented special problems in this matter. The resolutions are shown in Table 1.

The programs were generally similar in overall topography. They differed most in branching (Variable 15), the response required from the subject (Variable 16), equipment (Variable 17) and clinician skills (Variable 18). It should be noted that all four programs contain consequation of stuttering (Variable 5) even though this was the special characteristic of the P#3 program.

Transfer and Maintenance Programs.

There was only one Transfer Program which all subjects went through after they completed one of the Establishment Programs. The Transfer Program consisted of 6 series (different physical settings, increased audience, home, school, telephone and strangers) with differing numbers of steps in each series. Only the social/verbal reinforcer "good" was used during the Transfer Program for the completion of steps. For the first 4 series, the subjects had to read for 1 minute and converse for 4 minutes to pass each step. In the last 2 series, 5 minutes of fluent conversation was required in each step. There was a total of 23 steps. The minimal run time was 115 minutes. Initial work on the Transfer Program comes from Ryan (1970). The program is essentially the same program described in Ryan and Van Kirk (1971).

There was only one Maintenance Program which consisted of 4 steps requiring 3 minutes each of reading, monologue and conversation. Only the social/verbal reinforcer "good" was used for completing steps. The minimum run time was 36 minutes spread out over a 15-week period. This program is described by Ryan (1970) and is essentially the same program found in Ryan and Van Kirk (1971).

Subject, Clinician and Program Selection

The 15 speech clinicians of Pacific Grove, Carmel and the Monterey Unified School District were asked to submit names of children they had

FIGURE 1

Sample of Program Script for Programmed Traditional PT #1 Program

TITLE: Establishment PT (Programmed Traditional) NO.: 1

TARGET: Fluent Conversation in Clinic Therapy Room Rt: Redeemable Tokens and Social

COMMENTS: Demonstrate and practice the Behavior desired in Steps 4-7 five times before each step. Reinstruct to engage in appropriate behavior contingent on each stuttered word which was not modified (Steps 4-8).

STEP	STIMULUS	RESPONSE	Sch	C	BI
	Take Criterion Test				
Series A	Reading				
1	Instruct client to read. Identify stuttered words (say "there" after each stuttered word).	Read	--	4 minutes	245
2	Instruct client to read and identify stuttered words. Identify stuttered words (say "there" after each stuttered word).	Read and identify stuttered words (push counter button after each stuttered word).	100	4 minutes at 90% agreement	Program A-1
3	Instruct client to read and to identify stuttered words.	Read and identify stuttered words (push counter button after each stuttered word).	100	4 minutes at 90% agreement	Program A-2
4	Instruct client to read and to repeat stuttered words.	Read and repeat each stuttered word.	100	5 minutes at 90% or 0 SW/M	1

FIGURE 1 (continued)

Sample of Program Script

STEP	STIMULUS	RESPONSE	Sch	C	BI
Series A	Reading				
5	Instruct client to read and to repeat each stuttered word in a prolonged manner.	Read and repeat each stuttered word in a prolonged manner.	100	5 minutes at 90% or 0 SW/M	2
6	Instruct client to read and to prolong each stuttered word. (pullout).	Read and prolong each stuttered word. (pullout)	100	5 minutes at 90% or 0 SW/M	3
7	Instruct client to read as fluently as possible but to prolong each word that might be stuttered.	Read fluently but prolong each word that might be stuttered.	100	5 minutes at 90% or 0 SW/M	4
8	Instruct client to read fluently.	Read fluently.	100 per 5 minutes	5 minutes at 0 SW/M	5
	Go on to Monologue, Series B				
	Review Reading 1 minute every other session.				

TABLE 1

List of Program Variables for the Four Different Establishment Programs: #1 Programmed Traditional (PT), #2 Delayed Auditory Feedback (DAF), #3 Pause (P) and #4 Gradual Increase in Length of Utterance (GILCU).

Variables	#1 PT	#2 DAF	#3 P	#4 GILCU
1. Number of Steps	24	25	21	60
2. Minimal Run Time	111 minutes	110 minutes (Estimated)	105 minutes	105 minutes (Estimated)
3. Criterion	21 steps at 90 percent accuracy or 0 SW/M and 3 steps at 0 SW/M	25 steps at 0 SW/M	3 steps at 1 SW/M and 18 steps at 0 SW/M	60 steps at 0 SW/M
4. Formal Identification Steps	yes	no	no	no
5. Consequate Stuttering	re-instruct	stop and re-instruct	stop for .5-10 seconds	re-instruct
6. Consequate Fluency	1 token per step for 3 steps	1 token per step, 21 steps	1 token per step, 21 steps	1 token per correct response for 60 steps
7. Consequate Other	1 token per correct modification for 21 steps	pattern for 4 steps	none	none
8. Reinforcement Schedules	100 percent for correct responses	100 percent for passing steps	100 percent for passing steps	100 percent for correct responses
9. Instructions Stimulus	variable	variable	variable	variable
10. Branch	15 steps with modelling	36 steps with more reinforcement and pattern training	36 steps with lower criterion levels	153 steps with modelling and smaller steps

TABLE 1 (continued)

List of Program Variables

Variables	#1 PT	#2 DAF	#3 P	#4 GILCU
11. Recycle	every other step	Series A plus every other step	every other step	every other step with reduced criterion
12. Tokens	given per each correct response	given per passing step	given per passing step	given per each correct response
13. Token Exchange	50 per item	3 per item	3 per item	40 per item
14. Modes	reading monologue conversation	reading monologue conversation	reading monologue conversation	reading monologue conversation
15. Branch 245	modelling desired response	pattern training	raise criterion of SW/M	modelling and smaller steps
16. Response	cancel SW, prolong SW, fluent	prolong each word, fluent	stop after stuttered words, cancel, fluent	fluent
17. Equipment	counter	DAF machine	Signal light	none
18. Clinician Skills	count SW, time, score	count SW, time, score, operate DAF	count SW, time, score, operate light box	count SW, time, score

identified as stutterers. These children were interviewed by the project supervisor during the last two weeks in September, 1973. She collected a tape-recorded 2-minute reading and 3-minute conversational sample of each child. There were 31 children interviewed. Of these, 23 children met the following criteria: 1) normal intelligence defined as 85+ on an individual intelligence test; 2) English as their native language; 3) a stuttering rate of at least 3 or more stuttered words per minute, these stuttered words to be whole-word and/or part-word repetitions and/or prolongations and/or struggle behaviors; 4) the ability to read near grade level; 5) a consistent rate of stuttering at home, at school and in the therapy setting, this criterion was to exclude the incipient stutterer; 6) a label as a stutterer by at least one major person in the child's life such as his mother, father or teacher; and 7) confirmation by a qualified speech pathologist that the subject stuttered.

From this group, eight junior/senior high school and eight elementary school subjects (N 16) were chosen. Eight clinicians from the Monterey Unified School District were chosen and paired with two of the subjects. Commonly, the clinicians were paired with subjects they had referred from schools they served. Because some of the clinicians had not referred subjects and some had referred more than two, it was necessary for two clinicians to serve subjects in schools which they normally did not serve. This group was then organized into four groups of two clinicians and four subjects. These four groups were balanced as to the mean age of the subjects and the mean number of stuttered words per minute (SW/M) demonstrated by the subjects. One of the four Establishment Programs (PT, DAF, P, or GILCU) was randomly assigned to each of the four groups. Therefore, two clinicians and four subjects were involved with one of the four Establishment Programs. All eight clinicians were taught the same Transfer and Maintenance Programs.

Training and Monitoring of Clinicians

The eight clinicians were then put through a training program using a program manual, in October, 1972, in two sections composed of the following activities:

1. Identification of Stuttered Words. This procedure was accomplished using both audio tape recordings and video tape recordings of the 16 subjects in the project. The clinicians were trained to count stuttered words (whole-word repetitions, part-word repetitions, prolongations and struggle). This training required 2 hours.

2. Criterion Testing. The clinicians were taught to use a stopwatch and administer and record a Criterion Test which consisted of 5 minutes each of reading, monologue and conversation. This training required 30 minutes.

3. Administration of One of the Four Establishment Programs. Each pair of clinicians was taught one of the four programs separately from the other six clinicians. This training included reading the program scripts, carrying out the programs and recording the necessary data of the programs.

At the end of this training period, the clinicians had to demonstrate proficiency on the program with either the project director or project supervisor acting as a subject. This training required 2 hours.

A third section of training was completed in January, 1973. This involved the Transfer and Maintenance Programs.

4. Transfer and Maintenance Programs. This training was the same for all eight clinicians. They were taught to administer and record the data generated in the two programs. This training required 2 hours.

The project staff monitored each child on a weekly basis from October to March. In March, the monitoring was changed to a bi-weekly basis. The monitoring consisted of observing the entire therapy session with the clinician. The project staff checked the accuracy of program step administration and the counting of stuttered words. This information was fed back to the clinician either immediately, if he or she was making a gross error, or at the end of the session if there were only minor or no errors.

Program Operation Schedule

The clinicians began carrying out their Establishment Programs on November 1, 1973. They tape-recorded each session, administered program steps, timed the talking of the subjects, counted stuttered words and offered reinforcement for correct responses. At the conclusion of each session they computed SW/M and listed the steps on both a data sheet and a chart. They met with the subjects for two 30-minute periods a week. Because of extensive absenteeism by both clinicians and subjects during the Fall quarter, 1972, a make-up session policy was developed for the January through June project period. The clinicians were given a number of sessions to accomplish by various quarterly check points and a total (48) for the year. They were encouraged to make up the sessions missed either by additional weekly sessions or additional sessions on the day they saw the subjects.

Ancillary Activities

Parent Informed Consent. Before the subjects were assigned clinicians, each parent was informed about the nature of the project. There were 12 individual meetings held in the schools and one group meeting with four parents held at Behavioral Sciences Institute. The entire project was explained to the parents. Each piece of equipment (tape recorder, portable FM microphones, light box, DAF machine, tokens, etc.) was shown to the parents and its use described or demonstrated. The parents were also taught to operate a cassette tape recorder to collect natural speech samples at home. After this explanation-demonstration, the parents were encouraged to ask questions about the nature of the project. They then were asked to permit their children to participate in the project and signed informed consent forms. All 16 of the parents interviewed agreed to have their children in the project.

Teacher-Administrator Contact. Each teacher and adminstrator or counselor (in the junior and senior high school settings) was contacted concerning the project. Each individual teacher was interviewed about each subject. The total project was explained briefly and the teacher's role was defined. Each teacher was asked to participate in the project. Each administrator received a copy of a description of the project. All contacted personnel agreed to participate.

Volunteer Staff. A staff of four research volunteers was developed over the year to help collect natural speech samples in the schools, count whole words from tape recordings and record data collected from clinicians.

Consultation. Dr. Richard Martin of the University of Minnesota spent two days, March 29th and 30th, consulting on the project.

Evaluation

Tests.

There were two formal tests given: 1) a Stuttering Interview (SI) and 2) a Criterion Test (CT). These were adminstered before the Establishment Programs (#1), after the Establishment Programs (#2) and after the Transfer Program (#3). All subjects were given each test before and after the Establishment and/or Transfer Programs whether or not they had completed that program.

The Stuttering Interview (SI), an extra-program test, consisted of 14 different speaking tasks (see Appendix). It yielded about 10 minutes of talking by the subject and required approximately 15 minutes to administer. The SI was administered by the project supervisor. The subject's talking was timed. The SI was both video tape-recorded and audio tape-recorded. The total number of stuttered words was counted by the project supervisor from the video tape recording and the total number of words spoken was counted from the audio tape recording.

The Criterion Test (CT), an intra-program test, consisted of 3 parts: 5 minutes of reading, 5 minutes of monologue, and 5 minutes of conversation by the subject which generally required about 30 minutes of session time. The CT was administered and timed by the clinician. For CT #2 and #3 the DAF #2 subjects were instructed to, "Use your pattern," and the PT #1, P#3 and GILCU #4 subjects were instructed to, "Speak fluently."

A project staff member (usually the project supervisor) attended at least one CT #1, each CT #2 and each CT #3. Both the staff member and the clinician independently counted stuttered words during these tests. The count and the time of the project staff members were used in data analysis and deciding whether or not a subject had met criterion (.5 stuttered words per minute or less per mode) on CT #2 and/or #3. The total number of words spoken was counted from the audio tape recordings.

Natural Speech Samples.

Two types of samples of the subject's speech, one in the home and one in the school setting (Natural Speech Samples or NSS), were taken throughout the project year. The home sample (NSS-H) was collected by the parents (or the subject himself) who tape-recorded the subject's reading and/or monologue and/or conversation in different situations in the home. These samples were to be 15 minutes overall. The first 5 minutes of the subject's talking was selected for analysis. The school sample (NSS-S) was collected in the classroom. A portable, wireless FM microphone (Phonic Mirror 221T Model) was worn by the subject while engaging in regular classroom activities. The classroom activities varied widely from reading to conversation with a classmate and/or teacher and/or class discussion. A staff member with an FM receiver-tape recorder was stationed immediately outside or in some instances in the back of the room. The subject's talking was tape-recorded. The rule for length of sample was 5 minutes of the subject's talking or 1 hour of clock time, whichever came first.

The number of stuttered words for each home and school sample was counted by project staff from the tape recordings. Three, 30-second samples were randomly selected from every other NSS and the number of words spoken counted from them.

Measures of Verbal Output.

Whole word repetitions, part-word repetitions, prolongations and words accompanied by struggle were counted as stuttered words. The number of stuttered words, number of words spoken and the talking time of the subjects were converted into stuttered words per minute (number of stuttered words/talking time in minutes), and words spoken per minute (number of words spoken/talking time in minutes). The number of stuttered words was then divided by the number of words spoken to yield a percent of stuttering. The talking time of the subject represented only his actual talking. If he stopped talking, the stopwatch was stopped until he started talking again.

These three measures were used to describe the speaking behavior of the subjects. Stuttered words per minute (SW/M) is the most direct measure of the behavior (stuttering) under analysis. Words spoken per minute (WS/M) gives evidence of the total word rate of the individual. Percent of stuttering represents the interaction between SW/M and WS/M. None of these measures, in and of itself, completely represents the stuttering behavior, however SW/M tends to correlate very highly (.95 and .96 in two different samples) with percent of stuttering. WS/M is variable and does not correlate highly with either SW/M (-.04 and -.14 in two different samples) nor with percent (.33 and .37 in two different samples). Therefore it was decided to derive and present all of these measures for the different tests, but to use SW/M as the basic, consistent measure for program comparison and analysis. Program word count analysis was accomplished by selecting 3 samples (first, middle and end) from Establishment and Transfer program sessions. Three 30-second samples were selected from each of these 6 samples and counted.

Reliability and Accuracy of Counting and Timing.

The accuracy of these measures is of considerable concern. In order to determine this for the various measures, two observers counted independently and their counts were compared to yield a percent of agreement (count of observer #1/count of observer #2 X 100 =percent agreement. The larger number was always divided into the smaller.) The counting of stuttered words and words spoken and timing were of major interest.

In order to determine accuracy of counting stuttered words, three different procedures were used. The first was on the SI. Both the project director and the project supervisor independently counted the total number of stuttered words from each of the 40 video tape recordings. This served two purposes: 1) to determine the accuracy of the count and 2) to calibrate the project supervisor who did most of the counting of stuttered words in the project. If the counts were under 90 percent agreement, the video tape was viewed again. It was necessary to review only 5 samples out of 40. The total mean percent of agreement was 95.4 with a S.D. of 1.24.

A second procedure concerned the clinicians and either the project supervisor or the project director during the CT. This was done live. For CT#1 the criterion was 90 percent agreement or above for total counts and the counting procedure was repeated, if the two observers did not reach this criterion. It was necessary to repeat 5 of 16 counts. A mean of 96.8 percent with a S.D. of 3.3 was achieved. For CT#2 and CT#3 no recounting was done. The count of the project staff was used for data analysis. For CT#2 a mean of 85.0 percent with a S.D. of 13.9 was achieved. For CT#3 a mean of 74.6 with a S.D. of 25.4 percent was achieved. The mean for all three tests was 85.5 with a S.D. of 11.1. The reduction in percent of agreement for CT#2 and CT#3 was commonly due to the low counts. If the subject stuttered only twice with one observer counting only one, the percent of agreement was only 50 percent.

A third procedure was counting stuttered words during program operation. Three randomly selected tape-recorded samples of program run for each of the eight clinicians were listened to by the project supervisor who counted stuttered words. These counts were not independent in that the clinician could be heard counting on the tape recording. The percent of agreement ranged from 21 to 100 with a mean of 56.7 and a S.D. of 32.4. The most common error was clinician failure to count stuttered words or under counting.

Six different people including the project director and the project supervisor were trained to count words (all words spoken including all words in whole word repetitions, revisions and phrase repetitions, but not interjections of non-words). Thirteen different probes on word counting for the agreement on total word count for the SI and the CT among the six counters were conducted. These ranged from 86.7 percent to 99.7 with a mean of 95.3 and a S.D. of 3.7.

The final reliability check was on timing. The six different people who

counted total words spoken also re-timed the CT samples. The time computed by the clinicians was compared to the time computed by the observers. The percent of agreement on time ranged from 83.3 to 100 with a mean of 95.6 and a S.D. of 4.8. The most discrepancy occurred in conversation.

Interviews.

A number of interviews were conducted during the study. Each subject, his parents and teacher were interviewed before the program started, after the Establishment Program, and after the Transfer Program. The clinicians were interviewed at the end of the project year.

RESULTS

Subject Pre Program Performance

The subjects were 14 males and two females ranging in age from 7 - 16 years with a mean age of 11.6. All were enrolled in a public school. In Table 2 are shown the entering performances (SW/M, WS/M and percent) of the four groups of subjects.

The groups were comparable in age and test SW/M scores. The GILCU group was lowest in SI#1 SW/M scores while the other three groups were similar to each other. The groups were more similar in their SW/M performance on CT #1. A Kruskal-Wallis one-way analysis of variance (Siegel, 1956) on SW/M for the four groups on CT#1 was not statistically significant ($H=6.28$, $p > .05$). All groups showed higher stuttering rates in the NSS-H than in other samples, whereas the NSS-S rates were more similar to the other test scores. The Pause #3 group consistently ranked highest in SW/M for all tests, whereas the GILCU #4 group consistently ranked lowest.

A series of correlations among the various test scores in SW/M yielded the following correlations:

Screen and SI	.36*	SI and NSS-S	.14
Screen and CT	.36*	CT and NSS-H	.40*
SI and CT	.64*	CT and NSS-S	.30
SI and NSS-H	.24	NSS-H and NSS-S	.48*

* .35 SS at .05

The highest correlation was between the SI and the CT. The next highest was between the NSS-H and NSS-S.

The word rate data indicate that the GILCU group consistently spoke more rapidly during the tests and samples than the other three groups which agrees

Table 2

Means and Standard Deviations for Age, SW/M, WS/M, and Percent for Stuttering Interview (SI#1), Criterion Test (CT#1), Natural Speech Sample-Home (NSS-H), Natural Speech Sample-School (NSS-S) for Sixteen Subjects in the Four Establishment Programs: PT#1, DAF#2, P#3, and GILCU #4.

Program	Age	SI#1 SW/M	SI#1 WS/M	SI#1 Per-cent	CT#1 SW/M	CT#1 WS/M	CT#1 Per-cent	NSS-H SW/M	NSS-H WS/M	NSS-H Per-cent	NSS SW/M	NSS WS/M	NSS Per-cent
PT#1													
Mean	11.6	7.1	129.3	5.5	7.0	126.3	5.7	9.4	119.8	8.6	5.3	133.3	4.4
S.D.	1.9	2.7	4.9	2.0	3.9	18.4	3.5	5.6	33.7	6.9	.9	32.9	1.8
DAF#2													
Mean	12.0	6.8	107.1	6.6	6.4	119.0	5.3	8.0	138.9	5.8	3.3	147.8	2.3
S.D.	3.7	2.6	12.3	2.6	1.4	14.6	.7	2.2	19.9	1.4	.7	27.5	.6
P#3													
Mean	11.8	7.7	123.4	6.2	7.6	115.9	6.6	11.8	137.1	8.5	8.6	128.6	6.7
S.D.	3.9	3.2	6.9	2.4	3.2	14.8	2.6	2.3	13.0	2.6	3.8	11.8	3.0
GILCU#4													
Mean	11.3	4.4	130.0	3.3	5.9	128.7	4.7	7.0	128.9	6.2	3.7	179.0	2.1
S.D	2.8	1.5	13.7	.8	1.0	18.4	1.0	4.9	33.5	5.7	.7	21.4	.6
Total													
Mean	11.6	6.5	122.5	5.3	6.7	122.5	5.6	9.1	131.2	7.3	5.3	147.2	3.9
S.D.	2.8	2.6	13.2	2.0	2.5	15.8	2.0	4.4	25.0	4.4	.7	30.0	2.4

with the observation that the GILCU group demonstrated consistently lower SW/M rates. The percent scores generally do not show much difference from the SW/M measures for either subjects or groups on the SI and CT.

An analysis of the case histories of the subjects did not reveal any major differences among the four groups.

Analysis of the Four Establishment Programs

In this section the four Establishment programs will be individually analyzed and the performance of each subject discussed. The variables chosen for this analysis are: number of subjects completing the program, number of subjects passing CT #2 (.5 or less SW/M), SI #1 and SI #2 scores, CT #1 and CT #2 scores, Natural Speech Samples pre and during program, total session hours, total talk hours (actual talking time of the subjects), percent talk time(ratio of talk time to session time expressed as a percent), words spoken per minute (WS/M) and stuttered words per minute (SW/M) during the program. These variables represent both testing results and program operational data.

Programmed Traditional PT #1.

The results of tests and program operation are shown in Table 3. Only two subjects finished this program and only one was able to pass CT #2 (less than .5 SW/M). The session time for the two subjects who completed the program was a mean of 17.9 hours with a S.D. of 3.3 hours.

Subject J. D. completed the program, but could not pass CT #2 in monologue and conversation and had to be re-cycled once. He did not pass the second administration of CT #2. He demonstrated fairly good transfer effects as measured by the NSS. His mother and teacher both reported that he was speaking quite fluently at home and school, respectively.

Subject R. G. demonstrated great difficulty with the program and was only part way through the conversation series when the year ended. His major problem was in identification of stuttered words. He demonstrated very good fluency in the CT #2 test, much improvement on SI #2 and slight improvement in the home and school setting as measured by the NSS, although both his teacher and parent commented that they did not notice any change in his speech.

Subject G. L. demontrated good performance on the program, completed it, passed CT #2 and did well on SI #2. Although the NSS indicated improvement in the home and school, both parent and teacher reported that G. L. was still stuttering in these settings.

Subject M. W. demonstrated attendance problems. Consequently, he received only 8.6 hours of therapy and was only into monologue at the end of the year. His performance on the CT, SI and NSS did indicate improvement

Table 3

Age, Number Completing (C) and Number Passing the Criterion Test #2 (P), Means and Standard Deviations of SW/M for Stuttering interviews (SI), Criterion Tests (CT), Natural Speech Samples (NSS), and Hours of Session Time, Talk Time Hours, Percent of Talk Time and Means and Standard Deviations for Words Spoken per Minute (WS/M) and Stuttered Words per Minute (SW/M) During the Program for PT#1 Program.

Subject	Age	C	P	SI#1 Pre SW/M	SI#2 Post SW/M	CT#1 Pre SW/M	CT#2 Post SW/M	NSS Home Pre SW/M	NSS Home During Est. SW/M	NSS School Pre SW/M	NSS School During Est. SW/M	Total Session Hours	Total Talk Hours	Percent Talk Time	WS/M	SW/M
J.D.	11	C		8.6	1.2	4.5	.6	4.2	1.4	5.2	2.1	20.2	11.5	56.7	156.4	.9
R.G.	9			10.1	1.3	12.8	.8	15.8	9.5	6.9	6.1	21.0	13.7	65.0	142.2	1.7
G.L.	13	C	P	5.2	.6	5.1	.4	12.3	5.7	5.2	2.6	15.7	8.1	51.7	124.6	.6
M.W.	13			4.3	2.0	5.5	.9	5.4	4.2	4.8	2.3	8.6	5.5	63.4	170.5	1.0
Sum		2	1									65.5	34.7			
Mean	11.6			7.1	1.2	7.0	.7	9.4	5.2	5.3	3.3	16.4	9.7	59.2	148.4	1.2
S.D.	1.9			2.8	.6	3.9	.2	5.6	3.4	.9	1.9	5.7	3.6	6.2	19.6	.5

but not as much as the other three subjects in this group. The performance of subject M. W. demonstrated the value of completing the program.

There were two pertinent observations of the program operation. The first concerned criterion levels. It was necessary for the subjects to achieve 90 percent accuracy in modifications or demonstrate 0 SW/M to pass a step. The common result of the program was to reduce the frequency of stuttering (a mean of 1.2 SW/M during the program) which caused the subjects to encounter identification problems. Consequently, they passed steps by going to 0 SW/M rather than engaging in the modification behavior. The number and percentage of steps passed at 0 SW/M for the four subjects are shown below.

	Modes and Steps				
Subject	Reading (8)*	Monologue (8)*	Conversation (8)*	Total (24)*	Percent
J. D.	1	4	3	8	30
R. G.	2	6	-	8	50
G. L.	5	3	6	14	58
M. W.	1	-	-	1	12

*Number of steps in program

The subjects passed 45 percent of the steps by going to 0 SW/M rather than emitting the program behaviors of cancellations, prolongations, and pullouts. This program tended to operate as a punishment program rather than a modification program with the identification and modification behaviors serving as aversive consequences for stuttering.

A sub-analysis to determine a better criterion level revealed that a criterion of 75 percent accuracy would not have been very helpful, because it did not respond to the problem of low frequency of stuttering.

Changing the criterion to within one stuttered word would cause a difference. For example, if the subject counted 2 and the clinician counted 3 (66 percent agreement) this would constitute a pass. Using a criterion of within one stuttered word would have resulted in a decrease of trials for all the subjects. These data are shown below in percent decrease of trials. There would be a total mean of 36 percent decrease in trials which would have resulted in a decrease in mean run time from 16.4 hours to 10.5 hours.

Subject	Read	Monologue	Conversation	Total Mean
J. D.	50	50	50	50
R. G.	56	8	-	32
G. L.	50	30	20	33
M. W.	25	-	-	25

The clinicians demonstrated some problems in running the program, especially with the identification steps branch procedures. The timing of presentation of reinstructions, etc., was difficult for the clinicians e.g., the clinician was to say, "Remember to repeat the stuttered word," contingent on a stuttered word in step 4. If she said it too late, it did not serve its purpose of teaching identification and modification. If she said it too soon, it interrupted the subject. The reliability probe of the clinician's accuracy in counting stuttered words during the Establishment Program revealed 61.8 percent for one clinician and 76.0 percent for the other. The clinicians were not counting one stuttered word out of every four. The actual counts are shown below:

PT #1

	Probe			
Observer	1	2	3	Total
Clinician 1	13	2	11	26
Supervisor	13	3	18	34
Clinician 2	12	8	32	52
Supervisor	12	18	36	77

This program should be revised especially in criterion levels. However, the identification problem which exists in all steps will persist for some subjects (see performance of R. G.). The relatively poor performance on CT #2 also suggests that this program may have limits of effectiveness for stuttering children.

Two subjects did complete the program and all four subjects demonstrated improved fluency on the CT, SI and NSS which was related to the length of time they were in the program and how far they were able to progress in the program by the end of the training year. The program had a relatively high percent of talk time (59.2) which permitted the subjects opportunity to talk (practice). The program did reduce stuttering behavior.

Delayed Auditory Feedback DAF #2.

The results of tests and program operation are shown in Table 4. All four subjects completed the program and passed CT #2. However, their performance on SI #2 and the NSS indicated that they had not modified their use of the fluent speaking pattern sufficiently to replace their stuttering pattern in other talking situations. They did use their slow, prolonged speech pattern in CT #2 which is attested to by their word rate data, a mean of 39.4 WS/M with a S.D. of 21.4. This is well below their entering word rate level of 119.0 WS/M with a S. D. of 14.6.

Table 4

Age, Number Completing Program (C), and Number Passing Criterion Test#2 (P), Means and Standard Deviations of SW/M for Stuttering Interviews (SI), Criterion Tests (CT), Natural Speech Samples (NSS), Hours of Session Time, and Talk Time and Percent of Talk Time and Means and Standard Deviations of Words Spoken Per Minute (WS/M) and Stuttered Words Per Minute (SW/M) During the Program for DAF#2 Program.

Subject	Age	C	P	SI#1 Pre SW/M	SI#2 Post SW/M	CT#1 Pre SW/M	CT#2 Post SW/M	NSS Home Pre SW/M	NSS Home During Est. SW/M	NSS School Pre SW/M	NSS School During Est. SW/M	Total Session Hours	Total Talk Hours	Percent Talk Time	WS/M	SW/M
O.J.	16	C	P	9.0	7.1	7.1	0	10.1	8.3	4.0	3.7	3.0	1.9	63.0	22.4	0
B.K.	8	C	P	6.3	14.0	6.1	0	7.6	8.1	3.8	6.1	4.6	2.0	43.6	23.0	.1
R.S.	14	C	P	3.5	2.1	4.6	.3	5.5	3.5	2.9	3.8	7.8	4.1	52.8	40.0	.2
P.W.	10	C	P	8.6	2.0	7.8	.2	8.2	2.1	2.5	4.9	8.6	3.5	40.7	35.8	.4
Sum		4	4									24.0	11.5			
Mean	12			6.8	6.1	6.4	.1	8.0	5.5	3.3	4.6	6.0	2.9	50.0	30.3	.1
S.D.	3.7			2.5	6.0	1.4	.1	2.2	3.2	.7	1.1	2.6	1.1	10.1	8.9	.2

Subject O. J. went through the program extremely rapidly with almost no stuttered words and a word rate of 22.4 WS/M. He maintained this into CT #2, but demonstrated very little change in stuttering behavior on SI #2 and the NSS during the Establishment Program. Both parent and teacher reported little change in his speaking behavior.

Subject B. K. also went through the program rapidly with a word rate of 23.0 WS/M. His CT #2 and program performance duplicated that of subject O. J. However, the SI #2 and NSS during Establishment Program samples indicated an increase in SW/M over the pre-program samples. It is not uncommon for subjects on the DAF #2 Establishment Program to demonstrate an increase in stuttering in natural, extra-program speaking situations during the Establishment phase. This may be due to an increase in talking and/or a decrease in avoidance behavior or other factors. Subject B. K. did use slow, prolonged, fluent speech in one of his NSS-Home tape recordings. In addition, his mother later reported that his father discouraged attempts of B.K. to use his slow, prolonged fluent speech pattern at home. Both parent and teacher confirmed that there was little change in B.K.'s speech in the home and school setting at the end of the Establishment Program.

Subject R. S. had difficulty in the program and had to be re-cycled once in reading. Although he could do the slow, prolonged, fluent pattern he did not maintain it throughout a step and tended to speed up which resulted in stuttering. He passed CT #2 in reading on the second trial. He demonstrated little change in fluency on SI #2 and the NSS during the Establishment Program. Both parent and teacher confirmed that there had been little change.

Subject P. W. demonstrated the longest run time in the program. She had to be re-cycled two times in reading. Her clinician failed to count whole word repetitions during the first reading re-cycle on the training program, hence P. W. had to re-cycle reading a second time. Subject P. W. demonstrated a decrease in SW/M on SI #2 and the NSS-Home during the Establishment Program. There was a slight increase in SW/M in the NSS-School during the Establishment Program.

The program operated rapidly (a mean of 6.0 session hours) and the subjects did well on CT #2 with the use of their slow, prolonged fluent pattern. The percent of talk time (50.0) was adequate (Ryan and Van Kirk, 1974). There was little change except for an increase in stuttering in five of 12 comparisons between the pre and during SI and NSS. As mentioned earlier in the discussion of the performance of B. K., it is not uncommon for subjects on the DAF #2 Establishment Program to demonstrate increased stuttering in outside situations. It is not clear why this happens. It may be due to increased talking, less avoidance and/or other factors. Another possibility is that the subjects may have been patterned too slowly and at the end of the Establishment Program they had two discrete responses: stuttered speech and slow, prolonged fluent speech. Without instructions to use their patterned speech in other settings, they had not done so with the exception of B. K. who had been punished for this behavior. The one subject, P. W., who had demonstrated improved speech on SI #2 and the

NSS during Establishment also had the second highest word rate during the program (35.8 WS/M) and the highest word rate during CT #2 (58.5 WS/M).

The clinicians' major problems in running the program were counting stuttered words and monitoring the pattern. The reliability of the two clinicians during the program run was 0 and 100 percent resulting in a mean of 50 percent for both indicating that one of them made serious errors in not counting stuttered words (the clinician for O. J. and R. S.). The actual counts are shown below.

DAF #2

	Probe			
Observer	1	2	3	Total
Clinician 1	0	1	0	1
Supervisor	0	0	1	1
Clinician 2	0	0	0	0
Supervisor	11	1	5	17

The program did teach the slow, prolonged fluent speech pattern. Because of previous experience with the DAF Program (Ryan and Van Kirk, 1971; 1974) it was not expected that the subjects would transfer this pattern to their everyday talking without additional transfer training. Previous experience indicated that subjects both increased their word rate and transferred their fluent pattern during the Transfer Program (Ryan and Van Kirk, 1974). The data generated by the four subjects in the DAF Program are similar to those from subjects in other studies of the DAF Program. Increasing the word rate during initial training would improve the program.

Pause P #3.

The results of the tests and program operation are shown in Table 5. Only one subject completed the program and passed CT #2. One subject dropped out. Two subjects completed the program, but could not pass CT #2. The total session time for the three subjects who completed the program was a mean of 14.4 hours with a S. D. of 8.5. All subjects demonstrated improvement on SI #2 and NSS.

Subject T. E. was in the program for 18.8 session hours. He had to be recycled three times on CT #2. One reason for this recycling is that the clinician did not count carefully during the program training, therefore T. E. would pass steps and then not pass CT #2. Subject T. E. demonstrated an increase in stuttering in the SI #2, and decreases in the NSS. He seemed to be doing very well with a gradual decrease in stuttering in the program and in the NSS until the first CT #2 in March. During the next two months a gradual increase in stuttering occurred in both the program and the NSS. His mother

Table 5

Age, Number Completing Program (C), and Number Passing Criterion Test#2 (P), Means and Standard Deviations of SW/M for Stuttering Interviews (SI), Criterion Tests (CT), Natural Speech Samples (NSS), Hours of Session Time and Talk Time and Percent of Talk Time and Means and Standard Deviations of Words Spoken Per Minute (WS/M) and Stuttered Words Per Minute (SW/M) During the Program for P #3 Program.

Subject	Age	C	P	SI#1q Pre SW/M	SI#2 Post SW/M	CT#1 Pre SW/M	CT#2 Post SW/M	NSS Home Pre SW/M	NSS Home During Est. SW/M	NSS School Pre SW/M	NSS School During Est. SW/M	Total Session Hours	Total Talk Hours	Percent Talk Time	WS/M	SW/M
T.E.	15	C		7.0	8.6	10.1	.7	9.1	6.5	12.6	4.8	18.8	11.3	60.0	139.2	.9
G.G.	7	C		12.3	1.0	10.5	.8	12.6	8.9	5.5	3.1	19.7	14.1	71.7	132.8	1.1
S.I.	10			6.3	2.9	5.4	1.3	7.7	7.2	5.2	3.2	9.4	7.1	75.1	138.4	.9
J.I.	15	C	P	5.1	.6	4.2	.1	17.9	.2	11.0	4.7	4.6	2.9	63.0	121.6	.3
Sum		3	1									52.5	35.4			
Mean	11.8			7.7	3.3	7.6	.7	11.8	5.7	8.6	3.9	13.1	8.8	67.5	131.5	.8
S.D.	3.9			3.2	3.7	3.2	.5	2.3	3.8	3.8	.9	7.3	4.9	7.1	7.3	.3

confirmed this observation. T. E. had been one of the most "severe" (high SW/M rate) subjects and somewhat unintelligible. His stuttering blocks were reduced in intensity and he became much more intelligible.

Subject G. G. was in the program the longest (19.7 hours) of the four subjects. He had to be recycled twice. He demonstrated much improved fluency on CT #2, SI #2 and NSS.

Subject S. I. dropped out of the program after 20 sessions. He was on the monologue series. He demonstrated some change in stuttering on CT #2, SI #2, and NSS. He, like subject M. W. of the PT #1 program, provided evidence that it was important to complete the program. It was not clear why he dropped out. He said that he "did not like the program, but it was all right." His mother reported that he had begged her to get him out of the project because he did not like being stopped every time he stuttered when he was trying to tell something. He had shown much difficulty during the reading part, not as much with stuttering as with reading. He could not think of things to talk about during the monologue portion. In short, he was not running the program as well as the other three subjects when he dropped out.

Subject J. I. did extremely well in the program. He did demonstrate occasional attendance problems. All the tests (CT, SI, NSS) indicated improvement. Both parent and teacher reported that he had improved in the home and school settings.

The program generally ran as expected. There was a decrease in stuttering with the pause or time-out light being applied contingently on stuttered words. The subjects did not show a reduced word rate during the program. In fact, it was higher than their pre program rate (see Table 2). The program ran relatively long for two of the subjects, but these two subjects had very high entering stuttering rates. The percent of talk time (68.5) was relatively high which was due to the high percentage of reading activity during the program. Run time might be decreased by lowering criterion levels, but this could result in more difficulty on the CT. Only one of three subjects could pass the CT with the present criterion levels and extensive retraining or re-cycling.

This program appeared to be one of the easiest for the clinicians to run. However, the main emphasis of the program and the most critical event was the detection of stuttered words by the clinicians. The two clinicians demonstrated 21.0 percent and 79.0 percent respectively for a mean of 50 percent accuracy in the counting of stuttered words during the program. (The additional recycling of subject T. E. was caused by inaccurate counting by clinician 2 during the program.) The actual count is shown below.

P #3

	Probe			
Observer	1	2	3	Total
Clinician 1	30	7	69	106
Supervisor	44	10	80	134
Clinician 2	6	6	7	19
Supervisor	20	25	43	88

The performance of the three subjects who completed the program indicated that this is a very effective program, but relatively time consuming even with a high percent of talking. The length of program run time was related to the pre program stuttering rate.

Gradual Increase in Length and Complexity of Utterance GILCU #4.

The results of testing and program operation are shown in Table 6. All four subjects completed the program and three passed CT #2. The one subject who did not pass CT #2 dropped out after completing the Establishment Program. All four subjects demonstrated improved fluency on SI #2 and the NSS.

Subject B. C. performed well in the program and on CT #2, SI #2 and the NSS. She required the longest run time (13.7 hours) of the four subjects which was due to extensive branching in the monologue portion of the program. The Christmas holiday interrupted the program sequence when B. C. was at one of the last steps in the monologue series. When she returned to training after the vacation she demonstrated great difficulty in passing the step and had to go through extensive branching activities. Subject B. C. demonstrated an unusually high rate of stuttering in the home NSS.

Subject H.L. ran the program well. He demonstrated improved fluency on the SI #2 and the NSS.

Subject T.M. ran the program well and missed meeting criterion on CT #2 by only one stuttered word in the conversation mode. He said he liked the program, but the NSS process was bothering him, and was causing him academic difficulty. He also did not want to do the Transfer Program. His mother insisted that he leave the project. He demonstrated improvement on SI #2 and the NSS.

Subject J.R. completed the program in the shortest time (5.7 hours) of the four subjects. He demonstrated improved fluency on SI #2 and the NSS.

The program ran very similarly to those we have run before, (Ryan, 1971). There were no unusual differences except that the data suggested the four sentence steps could be improved by changing the criterion from 10 to 5. The clinicians had very little difficulty running the program. Their accuracy in counting stuttered words was 52 percent and 64.3 percent respectively yielding a mean

Table 6

Age, Number Completing Program (C), and Number Passing Criterion Test #2 (P), Means and Standard Deviations of SW/M for Stuttering Interviews (SI), Criterion Tests (CT), Natural Speech Samples (NSS), Hours of Session Time and Talk Time and Percent of Talk Time and Means and Standard Deviations of Words Spoken Per Minute (WS/M) and Stuttered Words Per Minute (SW/M) During the Program for GILCU #4 Program.

Subject	Age	C	P	SI#1 Pre SW/M	SI#2 Post SW/M	CT#1 Pre SW/M	CT#2 Post SW/M	NSS Home Pre SW/M	NSS Home During Est. SW/M	NSS School Pre SW/M	NSS School During Est. SW/M	Total Session Hours SW/M	Total Talk Hours	Percent Talk Time	WS/M	SW/M
B.C.	8	C	P	3.2	.4	6.3	.3	13.3	7.1	4.0	2.0	13.7	8.3	60.2	109.8	.7
H.L.	13	C	P	3.6	.2	6.8	.3	8.3	4.0	3.6	2.2	10.9	6.7	61.3	138.2	.6
T.M.	14	C		6.5	.6	4.6	.3	3.8	1.6	2.8	1.3	8.0	3.9	49.4	135.0	.4
J.R.	10	C	P	4.2	.5	6.0	.3	2.7	.2	4.5	2.5	5.7	3.6	62.3	128.0	.4
Sum		4	3									38.3	22.5			
Mean	11.3			4.8	.4	5.9	.3	7.0	3.7	3.7	2.0	9.6	5.6	58.3	127.7	.5
S.D.	2.8			1.5	.2	1.0	.0	4.9	2.5	.7	.5	3.5	2.3	6.0	6.3	.2

of 58.2 percent. The actual count is shown below.

GILCU #4

	Probe			
Observer	1	2	3	Total
Clinician 1	3	6	0	9
Supervisor	8	6	0	14
Clinician 2	17	10	1	28
Supervisor	51	26	2	79

The GILCU program was effective in reducing stuttering behavior and had a relatively high percent of talk time (58.3). There were no special problems and the clinicians ran it well.

Analysis of Four Groups.

The sixteen subjects were divided into four groups: I. Those who did not complete the program: II. Those who completed the program, but did not pass CT #2; III. Those who completed the program and passed CT #2; and Group IIIa (excluding DAF #2 subjects) was extracted from Group III. The results of this analysis are shown in Table 7.

Group I contained subjects from PT #1 and P#3 programs. Even though one of the subjects dropped out (S. I. of P#3) and one subject did not attend sessions consistently (M.W. of PT #1), the group had more run time than Group III (a mean of 13.0 hours compared to 8.3 hours). Group I generally demonstrated higher SW/M rates on post and during program measures than the other two groups. The percent talk time is highest for this group because they spent proportionately longer periods of time during the reading series of the programs which produced a high percent of talk time.

Group II contained subjects from PT #1, P#3 and GILCU #4 programs. Group II demonstrated higher SW/M rates pre program than the other two groups and lower post and during program SW/M rates (except for CT #2) than Group III. They demonstrated the longest run time of the three groups (a mean of 16.7 hours).

Group III contained subjects from all four programs. This group demonstrated the lowest SW/M in CT #2 and the shortest program run time. As a group they do not show the expected transfer effects of completing a program in the SI #2 and NSS samples; however, this is due to the presence of the four DAF #2 subjects who demonstrated either minor decreases in SW/M or increases in SW/M during NSS. If the performance of Group IIIa (without DAF subjects)

Table 7

N, Age, Means and Standard Deviations of SW/M in Stuttering Interviews (SI) #1 and #2, Criterion Test (CT) #1 and #2, Natural Speech Samples (NSS) Home and School, Pre and During, Mean Total Session Time, Talking Time and Percent of Talking Time for Four Groups: I. Those Subjects Who Did Not Complete the Establishment Program; II. Those Subjects Who Completed the Establishment Program Bit Did Not Pass the Criterion Test #2; III. Those Subjects Who Completed the Establishment Program and Passed Criterion Test #2; III.a. Those Subjects who Completed the Establishment Program and Program and Passed Criterion Test #2, (No DAF Subjects).

Group		N	Programs	Age	SI#1 Pre SW/M	SI#2 Post SW/M	CT#1 Pre SW/M	CT#2 Post SW/M	NSS Home Pre SW/M	NSS Home During SW/M	NSS School Pre SW/M	NSS School During SW/M	Total Session Hours	Total Talk Hours	Percent Talk Time
I.		2	Pt#1												
		1	P #3												
	Sum	3													
	Mean			10.6	6.9	2.0	7.9	3.0	9.7	7.0	5.6	3.8	13.0	8.8	67.8
	S.D.				2.9	1.0	4.2	1.0	5.5	2.7	1.1	2.0	6.9	4.3	6.3
II.		1	Pt#1												
		2	P #3												
		1	GILCU #4												
	Sum	4													
	Mean			11.1	8.6	2.9	7.4	.6	7.4	4.6	6.5	2.8	16.7	10.2	59.5
	S.D.				2.6	3.8	3.3	.2	4.2	3.7	4.2	1.5	5.8	4.4	9.3
III.		1	Pt#1												
		4	DAF #2												
		1	P #3												
		3	GILCU #4												
	Sum	9													
	Mean			11.6	5.4	3.3	6.0	.2	9.6	4.6	4.6	3.6	8.3	4.6	55.4
	S.D.				2.2	4.6	1.2	.1	4.5	2.9	2.5	1.4	4.4	2.5	8.6
III.a		1	Pt#1												
		1	P #3												
		3	GILCU #4												
	Sum	5													
	Mean			11.8	4.2	.5	5.7	.3	10.9	3.8	5.7	2.8	10.1	5.9	59.7
	S.D.			2.8	.9	.2	1.0	.1	5.7	2.7	3.0	1.1	4.9	2.5	4.6

is compared to Group II, it can be seen that the Group IIIa subjects demonstrated consistently lower SW/M rates on post program measures than did Group II.

This comparison shows rather clearly that the subjects who completed the program (Groups II and III) demonstrated more improved fluency than those who did not (Group I). There is an indication that subjects with higher pre program SW/M rates run longer (Group II vs. Group III). A final observation is that improvement on SI #2 tests and NSS may be related to the length of run time in the Establishment Program although a comparison of Groups II and III (with the DAF #2 subjects eliminated) suggests that this may not be true.

Back-up Reinforcers.

The token system allowed for 40 tokens per back-up reinforcer for GILCU, 50 for PT and 3 for DAF and P programs. Commonly, the back-up reinforcers were small toys for the elementary children and school supplies for the older junior/senior high group. Exceptions were made for three junior-senior students who asked for different back-up reinforcers. These were tape recordings and coupons to purchase gasoline.

Summary.

All four Establishment Programs did reduce the frequency of stuttering behavior in the sixteen subjects. The programs differed mostly in run time. Initial stuttering rate was related to program run time. The Establishment Program did produce improved fluency within the program and on the intra-program CT. Improvement was also observed in the extra-program SI (with the exception of the DAF #2 program) and on the NSS. However, it was noted that none of the subjects spoke as fluently during the NSS as they did during the SI and CT. Even those who had completed Establishment Programs and passed CT #2 were still demonstrating stuttering in the NSS. This finding supports the need for and value of a Transfer Program.

Analysis of the Transfer Program

There were eight subjects who completed one of the Establishment Programs and were on the Transfer Program. Results of the Transfer Program are shown in Table 8.

Delayed Auditory Feedback DAF #2.

Only two DAF #2 subjects completed the Transfer Program and none of the four passed CT #3. They operated at higher word rates during CT #3 (a mean of 132.5 with a S.D. of 21.9), but there was very little evidence of patterned speech. Their performance on the SI #3 was comparable to their performance on the CT #3, but was much improved over SI #2 (1.8 SW/M vs 6.1 SW/M). Their NSS performances were improved over their Establishment Program performances. The most important observation was that their word rates had increased (as predicted from previous study) during the Transfer Program.

Table 8

Number Completing (C), Number Passing (P), Sums, Means and Standard Deviations for Stuttering Interview (SI) #3, Criterion Test (CT#3), Natural Speech Samples (NSS), Total Session Hours, Talk Hours, Percent of Talk Time and Means and Standard Deviations of Words Spoken per Minute (WS/M) and Stuttered Words per Minute (SW/M) for Eight Subjects on the Transfer Program.

	Program	C	P	SI#3 SW/M	CT#3 SW/M	NSS Home During Transfer SW/M	NSS School During Transfer SW/M	Total Session Hours	Total Talk Hours	Percent Talk Time	WS/M	SW/M
	DAF #2											
Sum		2	0									
Mean				1.8	1.5	3.1	3.7	9.9	2.9	29.2	113.2	.3
S.D.				1.5	.9	2.7	2.0	2.1	.7	1.8	32.5	.1
	P #3											
Sum		1	1									
Mean				.6	0	.9	5.0	6.5	2.6	40.7	138.8	.2
	GILCU #4											
Sum		3	3									
Mean				.2	.1	1.7	.8	6.4	2.0	31.8	131.6	.1
S.D.				.1	.1	2.2	.8	.9	.3	.3	4.4	.1
	Total											
Sum		6	4									
Mean				1.1	.8	2.3	3.1	8.1	2.5	31.6	123.3	.2
S.D.				1.3	.9	2.2	2.0	2.4	.6	4.1	24.2	.1

Subject O. J. who had performed very well in the Establishment Program ran into difficulty in the Transfer Program. First, there was a one-month break between the end of the Establishment Program and the beginning of the Transfer Program. This was due to Christmas vacation and clinician illness. Second, subject O. J. apparently had "forgotten" his patterned speech and showed no signs of it during the initial transfer sessions after the break. He was reminded to use his pattern throughout the Transfer Program. Third, the clinician ran the Transfer Program very slowly. He met with O. J. only once a week rather than twice and often missed one or two weeks between sessions. We considered replacing the clinician, but this was not possible. Due to "loss" of pattern, and inconsistent sessions, subject O. J. did not complete the Transfer Program. He did demonstrate an increased word rate throughout (142.2) but it was accompanied by stuttering. There was also questionable counting accuracy by the clinician. The final CT #3 and SI #3 of subject O. J. indicated improvement both in the frequency of stuttering and the intensity of the blocks, but he did not meet the criterion of .5 SW/M or less to pass CT #3. This was an extremely unfortunate set of circumstances. Subject O. J. had been well motivated to improve. He had been extremely diligent in making his own home samples. There were many signs of his using fluent patterned speech at normal word rates on the final home samples. In his final interview he indicated that he still stuttered although he felt he had improved a great deal. His mother reported no improvement whereas his teacher said he had improved.

Subject B. K. did complete the Transfer Program and demonstrated good improvement on CT #3 and SI #3. He was using normal word rates in both of these tests (117.2 and 128.0, respectively). His word rate throughout the Transfer Program gradually increased. His final NSS indicated that he had improved in both the home and classroom. Both his teacher and parent commented on his improvement. The major problem with B. K. appeared to be that he was patterned too slowly during the Establishment Program and that his word rate, or rather his use of pattern at normal word rates, came too late in the Transfer Program to help him demonstrate enough consistent normal, fluent speech. Both his parent and teacher reported improvement at the very end of the Transfer Program.

Subject R. S. went through the program well. It was necessary to substitute another clinician and the project supervisor for the originally assigned clinician (the same clinician with attendance problems for subject O. J.) in order to complete the Transfer Program with R. S. What impact this change of clinicians and dual clinicians had on R. S. is not known, but he did not pass CT #3. Both his parent and teacher reported improvement.

Subject P. W. required the longest time period of the four subjects in the Transfer Program. She was using higher word rates throughout and demonstrated more stuttering. She completed the Transfer Program except for the three steps which her mother was to carry out at home. Her mother did them but did not count and consequate stuttered words correctly. There was not enough time for the clinician to finish these three steps. The parents and teachers of P. W. reported that she was speaking well in class and at home and had made remarkable improvement. The intensity and duration of her stuttering

had decreased immensely. Her common errors were whole-word and part-word repetitions.

It is difficult to evaluate the Transfer Program for this group because of all of the unusual circumstances. The major difficulty of the program is all the extra-program organization that is required to run it and concomitant reduction in percent talk time (30 percent). The most common difficult procedure for the DAF subjects was the Classroom Series C. step which required a public speech.

Subject B. K was still speaking in a slow, prolonged pattern when he reached that step and at first refused to do it. This step was postponed until his word rate was up. He then completed the step. Subject O. J. was still not very fluent when he reached that same classroom step and did not do it. The Home Program Series C. required that the parents do three steps accurately, i. e., timing speaking time and counting stuttered words. If the parents failed on these steps, the clinician was to do it. In two cases, the parents failed and it was not possible for the clinicians to do the steps themselves.

The effect of the Transfer Program on the subjects' speech in natural settings (NSS) was clouded by all the unusual circumstances. Subjects R. S. and P. W. demonstrated improved speech in the NSS and their parents corroborated this. Subjects O. J. and B. K. showed very little, although the final NSS samples of B. K. suggested improvement that was commensurate with his CT #3 and SI #3 performance.

Pause P #3.

Only one subject, J. I., came from the Pause #3 Program. He did very well in the Transfer Program and indicated improved speech in the NSS home sample. It was not possible to obtain more than one NSS sample early in the Transfer Program in the classroom setting so that J. I. may have been doing as well in class as he had at home. However, due to circumstance, we had several opportunities to observe J. I. in other settings. He was still noticeably stuttering. Subject J. I. did very well on SI #3 and CT #3. Both parent and teacher reported improvement. He was put on the Maintenance Program.

Gradual Increase in Length and Complexity of Utterance GILCU #4.

All three subjects from the GILCU #4 Program did well in the Transfer Program, on CT #3, SI #3, and the NSS. They all passed CT #3 and went on the Maintenance Program. The only unusual observation was the persistent, relatively high SW/M rate in the NSS-Home for B. C. Parents and teachers both reported improved speech for all three subjects.

There is nothing special to report on the Transfer Program performance of the three subjects. The program ran well. The subjects evidenced minimal stuttering throughout it. The percent of talk time (31.8) is comparable to that of the other Transfer Program subjects.

Stuttering Interview (SI)

The Stuttering Interview (SI) served the purpose of being an extra program measurement which measured the subjects' behavior outside the program but in a structured situation through a number of different speaking tasks. The results of SI #1, #2, and #3 in stuttered words per minute (SW/M), words spoken per minute (WS/M) and percent of stuttering are shown for all four program groups in Table 9.

SI #1.

The initial SI showed the PT #1, DAF #2, and P #3 groups to be fairly comparable in SW/M and percent of stuttering. The GILCU #4 group demonstrated a lower rate and percent. The GILCU #4 group had the highest word rate.

SI #2.

The second SI showed the GILCU #4 group to be the lowest in SW/M and percent with an extremely low rate of stuttering (.4 SW/M). The PT #1 group was the next lowest in SW/M and percent. This is of special interest because only two of the four PT #1 subjects finished the program. The DAF #2 group was the highest which reflected their lack of use of the slow, patterned, fluent speech. Only one DAF #2 subject (P.W.) used her fluent pattern in only one item on SI #2. The word rate information indicated that the PT #1 and DAF #2 groups spoke more rapidly than the other two groups. The P #3 group showed a decrease in word rate from SI #1.

A sub-analysis of the last two items on SI #2 (I. Telephone and J. Observation of subject with a stranger) comparing the subjects' performance on these items with their performance on the NSS revealed a relationship between the two. Those subjects (N 14) who demonstrated more than 1 SW/M on either of those items also demonstrated more than 1 SW/M in the NSS samples, whereas those two subjects (J. D. of PT #1 and G.G. of P #3) who demonstrated less than 1 SW/M on those two items also demonstrated less than 1 SW/M on the NSS. Should this observation be supported by additional data, it is possible that those two items could be used as a "Transfer Test" to determine which subjects needed the Transfer Program.

SI #3.

There were only eight subjects who took SI #3. The DAF program group showed improvement over their SI #2 performance and their word rate was similar to the other groups and higher than their initial rates. The one P #3 subject did very well on SI #3. The three subjects from the GILCU #4 group improved their performance over the SI #2 although their word rate dropped slightly.

Criterion Test (CT)

The Criterion Test (CT) was the intra-program test which measured how

Table 9

N, Means and Standard Deviations of SW/M, WS/M and Percent for Stuttering Interviews (SI) #1, #2, and #3 for Four Program Groups: PT #1, DAF #2, P #3, and GILCU #4.

Program	SI #1				SI #2				SI #3			
	N	SW/M	WS/M	Percent	N	SW/M	WS/M	Percent	N	SW/M	WS/M	Percent
PT #1	4				4							
Mean		7.1	129.3	5.5		1.2	135.3	.9				
S.D.		2.4	4.9	2.0		.6	10.6	.4				
DAF #2	4				4				4			
Mean		6.8	107.1	6.6		6.1	134.0	5.1		1.8	132.5	1.4
S.D.		2.6	12.3	2.6		6.0	14.7	4.0		1.5	7.7	1.1
P #3	4				4				1			
Mean		7.7	123.4	6.2		3.3	110.0	3.0		.6	144.0	.4
S.D.		3.2	6.9	2.4		3.7	12.5	3.3		-	-	-
GILCU #4	4				4				3			
Mean		4.4	130.0	3.3		.4	125.3	.3		.2	116.7	.2
S.D.		1.5	13.7	.8		.2	10.2	.2		.1	3.8	.2
Total												
Sum	16				16				8			
Mean		6.5	122.5	5.3		2.9	126.1	2.2		1.1	129.5	.9
S.D.		2.6	13.2	2.1		3.8	15.4	1.9		1.3	10.7	.7

well the subjects had learned the program behavior and whether or not they could proceed to the Transfer Program. The results of CT #1, CT #2, and CT #3 in SW/M, WS/M and percent stuttering for all four program groups are shown in Table 10.

CT #1.

The groups performed similarly on all three measures. The performance on the CT was chosen for statistical analysis because it better reflected the program activities than the SI. A Kruskal-Wallis one-way analysis of variance revealed no significant differences among the four groups on SW/M ($H = 6.28$, $p > .05$).

CT #2.

The most noticeable difference among the groups on CT #2 is the word rate of the DAF #2 Program group. This low rate reflected their use of slow, prolonged fluent, patterned speech which they were taught to use during the DAF #2 program. This performance indicated they were capable of using the pattern. A Kruskal-Wallis one-way analysis of variance revealed no significant difference among the four groups on SW/M in CT #2 for those who had completed the program ($H = 6.48$. $p > .05$).

CT #3.

All eight subjects were given CT #3 although only six had finished the Transfer Program. The performance of the DAF #2 group shows that their stuttering increased over CT #2. This reflected their inability to use patterned fluent speech at higher word levels (a mean of 132.5 WS/M) and their difficulty in the Transfer Program. A secondary purpose of the Transfer Program for subjects from the DAF #2 program was to teach the subjects to gradually improve their fluency to the point that their patterned fluent speech resembled normal speech in word rate and other prosodic elements. A Kruskal-Wallis one-way analysis of variance on SW/M revealed a significant difference among the three groups ($H = 11.7$, $p = .02$). The DAF #2 program group had significantly higher SW/M rates than either the P#3 or GILCU #4 program groups.

Comparison of SI and CT.

A final comparison of the total SI performance with CT performance in SW/M and WS/M is shown below:

	#1 (N16)		#2 (N16)		#3 (N 8)	
	SW/M	WS/M	SW/M	WS/M	SW/M	WS/M
SI	6.5	122.5	2.9	126.1	1.1	129.5
CT	6.7	122.5	.5	109.2	.8	128.5

Table 10

N, Means and Standard Deviations of SW/M, WS/M and Percent for Criterion Tests (CT) #1, #2, and #3 for All Four Program Groups: PT #1, DAF #2, P #3, and GILCU #4.

Program	CT #1				CT #2				CT #3			
	N	SW/M	WS/M	Percent	N	SW/M	WS/M	Percent	N	SW/M	WS/M	Percent
PT #1												
Sum	4				4							
Mean		6.9	126.3	5.7		.7	144.4	.4				
S.D.		3.9	18.4	3.5		.2	13.5	.2				
DAF #2												
Sum	4				4				4			
Mean		6.4	119.0	5.3		.1	39.4	.2		1.48	132.5	1.1
S.D.		1.4	14.6	.7		.1	21.4	.0		.9	21.9	.5
P #3												
Sum	4				4				1			
Mean		7.6	115.9	6.6		.7	119.2	.6		.0	140.0	.0
S.D.		3.2	14.8	2.6		.5	14.8	.4		-	-	-
GILCU #4												
Sum	4				4				3			
Mean		5.9	128.7	4.7		.3	133.7	.2		.1	119.5	.1
S.D.		1.0	18.4	1.0		.02	22.9	.2		.1	20.8	.1
Total												
Sum	16				16				8			
Mean		6.7	122.5	5.6		.5	109.2	.4		.8	128.5	.6
S.D.		2.5	15.8	2.0		.4	45.7	.3		1.0	19.8	.7

This comparison indicated a great similarilty between SI and CT test performances especially tests #1 and #3. The differences in CT #2 were produced by the performances of the DAF #2 group who spoke in slow, prolonged, fluent pattern during CT #2, but not during SI #2 and of those subjects who did not complete programs.

Natural Speech Samples (NSS)

The Natural Speech Samples, (NSS) measured the subjects' performance in the natural settings of home and school. These data included the performance of all sixteen subjects. Two types of samples were taken; one in the home setting (199 samples) and one in the school setting (145 samples) for a total of 344 samples.

NSS-Home.

The results for the NSS in the home in SW/M, WS/M and percent of stuttering pre Establishment Program, during the Establishment Program, the last sample in the Establishment Program, during the Transfer Program, and the last sample in the Transfer Program are shown for all four program groups in Table 11.

The "During" samples are composed of several measures taken while the program was in process. The "Last" sample is the last sample in that phase expressed in SW/M. The "During" samples have the power of several observations whereas the "Last" sample most accurately represented the speech of the subject as he completed the program. Often transfer or training did not occur until the final steps in a program when the subjects were in the conversation mode. In most instances the "Last" sample was lower than the "During" sample.

The pre Establishment Program samples indicated that the PT #1 and P #3 groups had higher SW/M rates than the other two groups. Word rates were comparable among the DAF #2, P #3 and GILCU #4 groups.

The "During" Establishment Program samples indicated a decrease in frequency of stuttering from the pre program samples and an increase in word rate. The P #3 and DAF #2 groups showed the highest SW/M rates. Word rates were comparable between the PT #1 and GILCU #4 groups. The P #3 group showed a decrease in word rate. The "Last" samples of SW/M showed the GILCU #4 and P #3 groups with less SW/M.

The "During" Transfer Program samples indicated further decrease in SW/M and a word rate similar to the "During" Establishment Program rates. A comparison of the SW/M of those subjects who were in the Transfer Program (DAF #2 and GILCU #4) with those who were not (PT #1 and P #3) generally revealed lower SW/M for those who had been in the Transfer Program. This suggested the effects of the Transfer Program to produce transfer of fluency. A comparison of the SW/M rates for those subjects who had been through the Transfer Program with their "Last" sample in the Establishment Program demonstrated the same finding, especially for the DAF #2 group.

Table 11

Number of Samples (No.), Means and Standard Deviations of SW/M, WS/M and Percent for Natural Speech Samples in the Home (NSS-H), Pre Establishment Program, During the Establishment Program, Last Sample in Establishment Program (Last), During the Transfer Program, Last Sample in Transfer Program (Last) for All Four Groups: PT #1, DAF #2, P #3 and GILCU #4.

Program	Pre Establishment				During Establishment					During Transfer				
	No.	SW/M	WS/M	Percent	No.	SW/M	WS/M	Percent	Last SW/M	No.	SW/M	WS/M	Percent	Last SW/M
PT #1														
Sum	9				31									
Mean		9.4	119.8	8.6		5.2	141.4	3.7	3.8					
S.D.		5.6	33.7	6.9		3.4	17.5	2.4	3.3					
DAF #2														
Sum	23				24					26				
Mean		8.0	138.9	5.8		5.5	153.2	3.6	5.3		3.1	149.1	2.1	1.9
S.D.		2.2	19.9	1.4		3.2	22.3	2.2	3.8		2.7	10.9	.7	1.2
P #3														
Sum	16				16					3				
Mean		11.8	137.1	8.5		5.7	130.9	4.6	3.7		.9	137.0	.1	.4
S.D.		2.3	13.0	2.6		3.8	22.1	3.2	2.9		-			
GILCU #4														
Sum	17				29					5				
Mean		7.0	128.9	6.2		3.7	143.2	2.4	2.1		1.6	137.0	1.1	.9
S.D.		4.9	33.5	5.7		2.5	4.8	1.0	2.3		2.1	4.2	1.0	1.1
Total														
Sum	65				100					34				
Mean		9.1	131.2	7.3		5.0	142.2	3.6	3.7		1.9	143.4	1.1	1.3
S.D.		4.4	25.0	4.4		3.0	18.2	2.2	3.0		2.3	10.2	1.0	1.1

Most of the parents were fairly diligent initially in the year about making the samples or having their children make the samples. However, some were not consistent and four parents (not counting the two subjects who dropped out of the study) discontinued or became sporadic in the process during the latter part of the project.

The parents were asked to make 15-minute tape recordings. From these tape recordings were selected the first 5 minutes of the subject's talking. The mean length of total sample was 8.9 minutes with a mean length of subject talking of 4.7 minutes which yielded 52.8 percent talking.

NSS-School.

The results for the NSS in the school in SW/M, WS/M and percent of stuttering pre Establishment Program, "During" the Establishment Program, the "Last" sample in the Establishment Program, "During" the Transfer Program and the "Last" sample in the Transfer Program are shown for all four program groups in Table 12.

The pre Establishment Program samples indicated the PT #1 and P #3 groups had the highest SW/M. The word rates varied among the groups with the GILCU #4 showing the highest rate.

The "During" Establishment Program samples indicated a decrease in frequency of stuttering from the pre program samples and variable word rate with some groups increasing (PT #1 and DAF #2) and other groups decreasing (P #3 and GILCU #4). The "Last" samples in Establishment show the GILCU #4 to have the lowest SW/M.

The "During" Transfer Program samples indicated further decrease in SW/M and a word rate similar to the "During" Establishment Program rates. A comparison of these groups who completed the Transfer Program (DAF #2 and GILCU #4) with those who did not (PT #1 and P #3) showed the same trends as with the home samples, i.e., the Transfer Program further reduced stuttering behavior in natural speech settings.

The school samples were taken with the rule of 5 minutes of talking or 60 minutes of clock time whichever came first. The results were that the samples averaged 28.9 minutes and the talking time of the subjects averaged 4.3 minutes which yielded 14.8 percent talking.

Although the teachers and subjects were generally cooperative in the collection of the NSS in the classroom, this process was found to be extremely time consuming. Some of the common problems were equipment failure, subject absence, teacher absence, teacher re-scheduling of activities, and change of teachers. Surprisingly enough, having the subjects wear the portable microphone in the classroom was not a problem and most of the subjects actually seemed to enjoy doing it. Many of the other children in the elementary school subjects' classrooms asked to wear the microphone. Another observation was that extra talking "to the microphone" dropped out after the

Table 12

Number of Samples (No.), Means and Standard Deviations of SW/M, WS/M and Percent for Natural Speech Samples in the School (NSS-S), Pre Establishment Program, During the Establishment Program, Last Sample in the Establishment Program (Last), During the Transfer Program, Last Sample in Transfer Program (Last) for All Four Groups: PT #1, DAF #2, P #3 and GILCU #4.

Program	Pre Establishment				During Establishment					During Transfer				
	No.	SW/M	WS/M	Percent	No.	SW/M	WS/M	Percent	Last SW/M	No.	SW/M	WS/M	Percent	Last SW/M
PT #1														
Sum	8				25									
Mean		5.3	133.3	4.4		3.3	143.7	2.3	2.4	-				
S.D.		.9	32.9	1.8		1.9	16.4	1.4	2.8					
DAF #2														
Sum	10				10					17				
Mean		3.3	147.8	2.3		4.6	149.5	2.8	3.9		3.7	155.1	2.4	2.5
S.D.		.7	37.5	.6		1.1	24.5	1.0	1.2		1.9	30.7	1.0	1.3
P #3														
Sum	10				26					1				
Mean		8.6	128.6	6.7		3.9	114.9	3.5	4.2		5.0	132.0	3.8	5.0
S.D.		3.8	11.8	3.0		.0	19.3	1.0	3.2		-			
GILCU #4														
Sum	11				18					9				
Mean		3.7	179.0	2.1		2.0	164.4	1.2	1.1		.8	168.7	.5	.3
S.D.		.7	31.4	.6		.5	24.5	.1	.6		.8	28.7	.5	.2
Total														
Sum	39				79					27				
Mean		5.3	147.2	3.9		3.5	142.7	2.4	2.9		2.8	157.3	1.9	2.0
S.D.		.7	30.0	2.4		1.5	26.7	1.0	2.4		2.2	23.8	.5	1.9

first few experiences.

One observation of both the NSS-Home and NSS-School samples was that only one subject (J. R . of the GILCU #4 program) demonstrated 0 SW/M. Few of the subjects in the NSS settings were as fluent as they were on the CT and SI. It may be that stuttered words were overcounted (whole-word repetitions may be considered normal disfluencies) or it may be that normal fluency in normal settings contains stuttered words so that to expect 0 SW/M in the NSS is unreasonable. Based on the performance of the subjects who completed the Transfer Program and passed CT #3 (J. I., B. D., H. L. and J. R.) a criterion of 1 SW/M (whole-word repetitions or part-word repetitions) may be reasonable to validate the achievement of fluent speech in the natural environment.

Comparison of NSS-Home and NSS-School.

A comparison of the SW/M and WS/M of the total Home and School samples is shown below:

	Pre		Establishment		Transfer	
	SW/M	WS/M	SW/M	WS/M	SW/M	WS/M
Home	9.1	131.2	5.0	142.2	1.9	143.4
School	5.3	147.2	3.5	142.7	2.8	157.3

These data suggest a higher SW/M in the home setting than in the school setting, except for those subjects who had been through the Transfer Program. This may reflect a true difference between these two settings or it may be due to the sampling procedures, i.e., the home setting samples tended to be longer (4.7 minutes vs. 4.3 minutes) and the school setting samples tended to vary more with many different kinds of reading and speaking activities and a high number of short conversational interchanges.

Comparison of NSS and SI and CT.

The performance of the sixteen subjects on the NSS (home and school) and the SI and CT are shown below in SW/M, WS/M, and percent.

	Pre (#1)			Establishment (#2)			Transfer (#3)		
	SW/M	WS/M	%	SW/M	WS/M	%	SW/M	WS/M	%
NSS-Home	9.1	131.2	7.3	5.0	142.2	3.6	1.9	143.4	1.1
NSS-School	5.3	147.2	3.9	3.5	142.7	2.4	2.8	157.3	1.9
SI	6.5	122.5	5.3	2.9	126.1	2.2	1.1	129.5	.9
CT	6.7	122.5	5.6	.5	109.2	.4	.8	128.5	.6

These data show a gradual increase in SW/M as the sampling situation becomes more informal, moving from the structured intra-program CT to the very unstructured extra-program NSS-Home. The correlation between CT #1 and pre program NSS-Home was .40 (SS at .05), whereas the SI #1 and the NSS pre program were correlated but not statistically significantly. The most striking difference between the more formal measures (SI and CT) and the less formal (NSS-Home and NSS-School) was in word rate. The NSS samples were similar to each other and were, on the average, 18.5 WS/M higher than the SI and CT samples.

Comparison of NSS and Training.

In Figure 2 are shown the results of the NSS collected in the home and school settings. Stuttering and word rates in the training programs are also shown. There were 344 (199 home and 145 school) such samples collected and analyzed.

The stuttering rate samples indicate that the subjects demonstrated somewhat comparable rates in the Fall although the rate in the home was the highest. During the Winter (most subjects were either in the middle of Establishment Programs or in Transfer) the rates in the home and school indicate a decrease in stuttering with the rate in the training program extremely low. The Spring sample demonstrates further decreases in stuttering in all three settings although the rate in the home setting was still the highest. Although the subjects performed best in the training program setting, they did demonstrate improvement in the NSS, also.

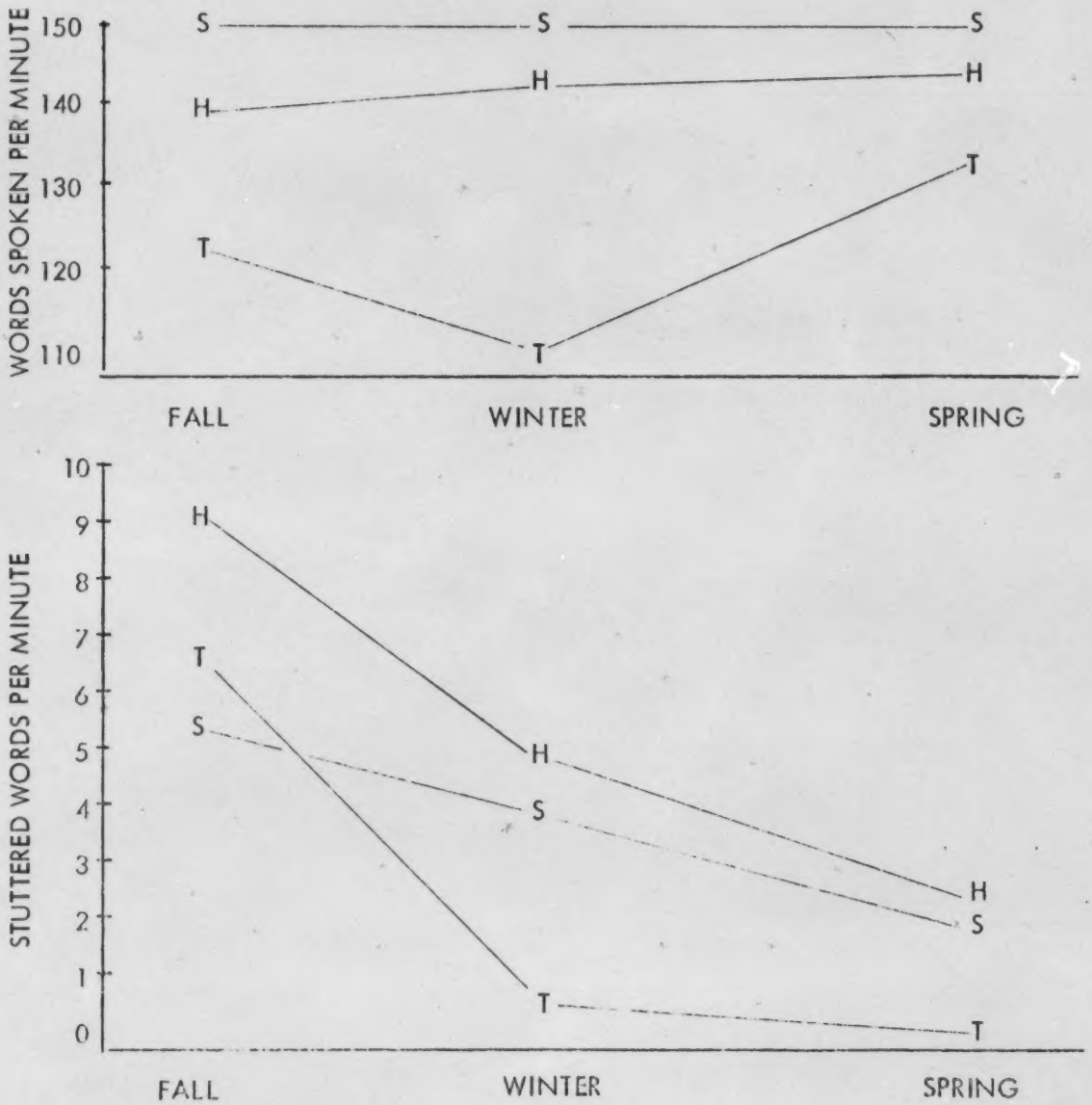
The finding that the subjects demonstrated more stuttering in the home samples than in the school samples may be an accurate observation which has value to training programs and the understanding of the problem of stuttering, or it may be a simple artifact of the nature of the collection of the samples. The home samples tended to consist more of conversation in connected speech whereas the school samples commonly consisted of short answers to questions or reading. People who stutter tend to be more fluent in the latter two activities.

The word rate information showed little change over the three sampling periods for the home and school samples. The word rate during training programs was considerably slower although the final Spring sample shows it becoming more similar to the home and school samples. Because one of the programs (DAF) was specifically designed to reduce word rate, there is a reduced rate shown in the Winter sample in training programs.

Although these data generally reveal that the longer the subjects were in the programs (either Establishment or Transfer) the more transfer of fluent speech to their natural speaking environments occurred, a sub-analysis indicated that those subjects who had completed Transfer Programs (especially the three GILCU children) did better in the NSS than those who did not. There were some interesting variations: J. D. (PT program) who did not go through a Transfer Program demonstrated very good fluent speech at home and at

FIGURE 2

Stuttered Words Per Minute (SW/M) and Words Spoken Per Minute in Natural Speech Samples Home (H) and School (S) and in the Training Programs (T) During Fall, Winter and Spring 1972-1973.



school. R. G. (PT program only with no Transfer Program) demonstrated very good fluency in the program and during SI and CT tests, but very little transfer. All of the DAF subjects had been through the Transfer Program, but they did not consistently demonstrate fluency in the home and school settings.

Some additional observations were that the subjects did not talk very much in the classroom in the Fall samples. This may be due to their stuttering or it could be that some classroom situations did not lend themselves well to encouraging talking. However, during the year the subjects began to talk more. Again this could reflect an increase in speech skill and confidence or they could just have become accustomed to the NSS process. Also, teachers seemed to encourage more talking in the latter phases of the study.

There is evidence that all four measures are affected by the programmed training. The reductions in stuttering shown in them are related to extent of training experience, i.e., Establishment and Transfer Programs. Further evidence was given that the most stringent or conservative measure of fluency to determine the effects of a training program was the NSS-Home sample which consistently showed higher rates of stuttering except for the subjects who had been through the Transfer Program.

Analysis of Individual Subject Performance in NSS, SI, CT and Training.

In Figure 3 is shown the performance of subject J. R. in Stuttering Interviews (SI), Criterion Tests (CT), training (GILCU) and Natural Speech Samples in home and school (NSS-H, NSS-S) over a two-year period. These data are recorded on six cycle logarithmic graph which is especially sensitive to changes under one movement (Stuttered Word) per minute.

The measures show similar performances during the pre program time period with the exception that the NSS-H shows a slight decrease. When the subject began the Establishment Program (EA, EB, EC) training, his rate decreased in training with a concurrent slight change in NSS rates. The second set of SI and CT data showed a decrease in stuttering which was also reflected in the NSS-H and S. When the subject reached the Transfer Program (TA, TB, TC, TE, TF, TD), there was continued decrease in stuttering rate with some upswings in rate in TC (School Series of the Transfer Program). After this period, the subject demonstrated extremely low rates in all samples. The third SI and CT and Maintenance Program (M), indicated slightly higher rates, although all were under .5 SW/M. The SI measures during the three follow-up re-checks indicated very slight increases with the NSS measures being usually lower. Subject J. R. had reported some difficulty during the January-February period, but this was not shown in his performance during the samples.

Similar data were collected, recorded and analyzed for the other 15 subjects. During the Establishment phase, 8 subjects (3 PT, 2 P, and 3 GILCU) indicated moderate decreases in rate in NSS concensurate with training, 7 subjects (4 DAF, 1 GILCU, and 2 P) indicated slight decreases

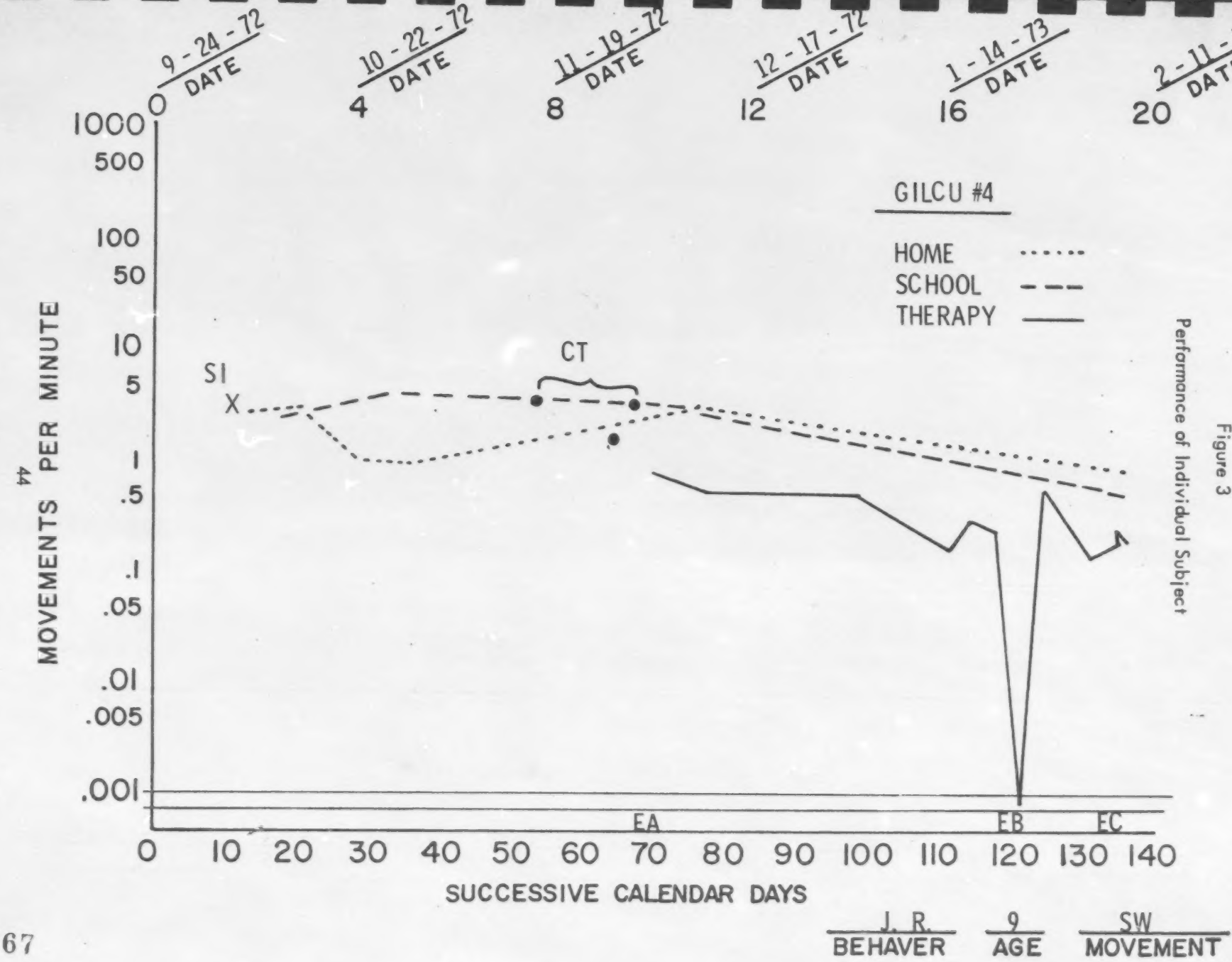


Figure 3
Performance of Individual Subject

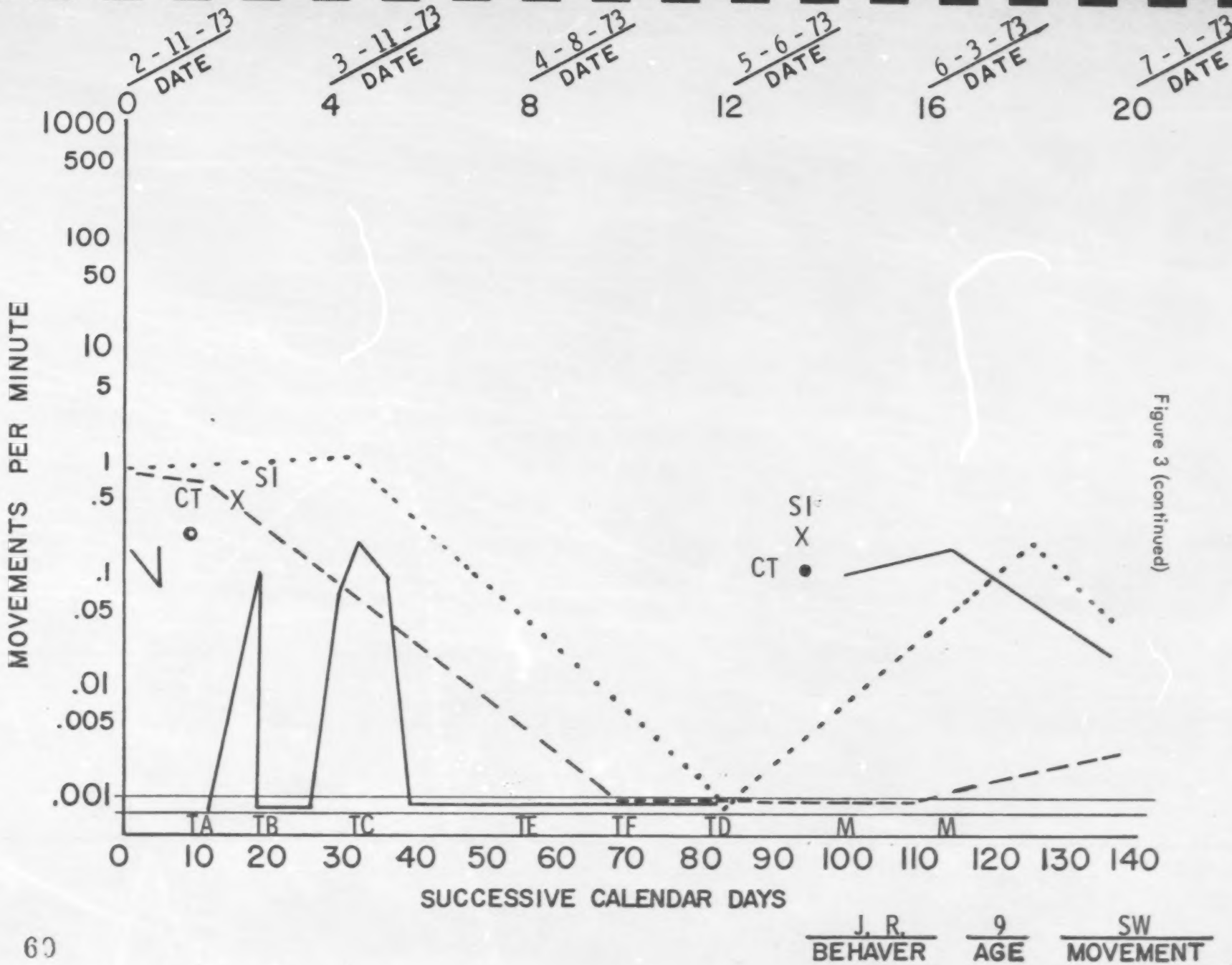


Figure 3 (continued)

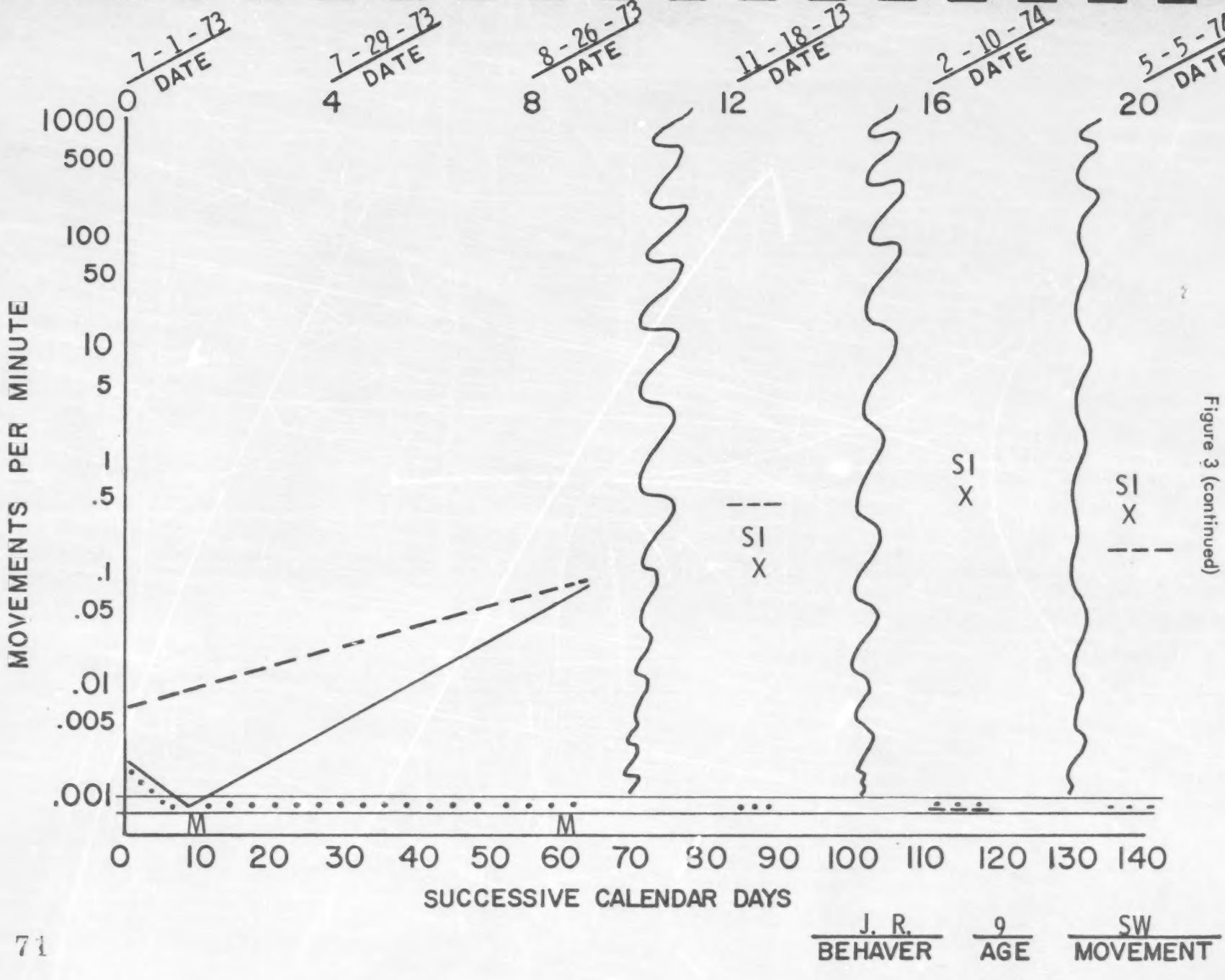


Figure 3 (continued)

in rate in NSS, and one subject (R.G. of PT) indicated no change. All eight of the subjects who went into the Transfer Program indicated additional decreases in rate in the NSS. The major change in rate (a decrease in stuttering) came for most subjects during the Establishment Program with the exception that all four of the DAF subjects indicated only slight changes. This was due to the time factor (the DAF subjects ran faster) and their lack of use of the pattern in the NSS. Only two DAF subjects demonstrated pattern in the NSS and these were very infrequent. The NSS changes for the DAF group came during the Transfer Program.

All of the NSS data indicated that for most subjects a decrease in stuttering rate occurred in the extra program settings. The extent of these decreases was contingent upon how far they went in the program sequence. There were very few instances where the NSS performance was as fluent as the performance in the training program.

Interviews

Parent-Teacher Interview.

Interviews with each parent, teacher and subject were conducted before the Establishment Program started, after the Establishment Program and after the Transfer Program. The results of the parent-teacher interviews for the groups combined as a total are shown in Table 13. The interview question is listed first, the answers categorized, and the number of people who gave that answer are listed.

Question one attempted to probe, without the use of the word "stuttering," whether or not the parents and teacher were aware of the subjects' stuttering. All of the parents and most of the teachers had noticed talking difficulty and 9 of them used the word, "stuttering." Some change in response to this question is seen in interviews #2 and #3 with both parents and teachers indicating they no longer noticed stuttering. In the final interview more teachers responded with "none" or "no," whereas only one parent did so. This correlated with the NSS observation of more stuttering at home.

Question two attempted to assess variability. Both parents and teachers indicated that the stuttering did vary from situation to situation.

Question three asked the parents and teachers to rate severity to talking difficulty and it is of interest to note how much they agreed overall. Five of the teachers could not respond in the first interview commonly because they had not heard the subjects talk enough. The parents tended to rank the subjects as better in interview #2 after the Establishment Program had been completed, whereas the teachers ranked the subjects as being better after the Transfer Program.

Question four was to assess the occurrence of avoidance. According to

Table 13
Parent-Teacher Interviews 1, 2 and 3.

Question 1: Does (child's name) ever have trouble talking? Tell me about it.

Interview Person and No.	N	NR*	Never Noticed	None, No	Does Not Talk Much	Yes and Explain	Yes and "Stutters"
1	16						
Teacher			3		1	9	2
Parent							
2	16						
Teacher			3			9	3
Parent				3		9	4
3	8						
Teacher			1	3		1	3
Parent				1		3	4

Question 2: Is (child's name) speech better sometimes than others?

Interview Person and No.	N	NR	Do Not Know	No or Same	Yes	Yes and Explain
1	16					
Teacher		6	2	1	3	4
Parent		2		2	4	9
2	16					
Teacher				2	2	10
Parent		2			1	13
3	8					
Teacher		2		2	1	3
Parent		1				7

Question 3: How would you rate his talking problem?

Interview Person and No.	N	NR	None 1	2	3	4	5	6	Severe 7
1	16								
Teacher		5			2	5	4		
Parent				4	2	6	3		1
2	16								
Teacher		1	1	3	7	3	1		
Parent			4	2	4	3	2		1
3	8								
Teacher			3	3	1	1			
Parent			1	2	4			1	

*No Response

Table 13 (continued)
Parent-Teacher Interviews 1, 2 and 3

Question 4: Does (child's name) ever avoid talking?

Interview Person and No.	N	NR	No	No and Explain	Yes	Yes and Explain	Does Not Talk Much, Shy
1	16						
Teacher		3	7	1		3	2
Parent			10			5	1
2	16						
Teacher		1	9	1	2	2	1
Parent		2	10		1	3	
3	8						
Teacher		1	6		1		
Parent		1	4	1		2	

Question 5: What do you do to help (child's name) talk better? May give more than one answer)

Interview Person and No.	N	NR	Nothing	Listen	Talk to Child	Reduce Press.	Speech Advice	Encour-age Talk	Attitude Advice	Control Others
1	16									
Teacher		1	6	6		1	2	1		2
Parent			3				11	2	1	
2	16									
Teacher		1	5	1	1	1	2	1	1	
Parent		1	6	1		1	7			
3	8									
Teacher			5		2		2			1
Parent		2	1	1			4			

Question 6: What do you think causes (child's name) talking problem? (May give more than one answer. Did not ask on second and third interviews.)

Interview Person and No.	N	NR	Do Not Know	Parents and Home	School	Pressure	Person-ality	Other Problems	Specific Events
1	16								
Teacher		4	6	3		1	2		
Parent			4	1	1	1	1		10

Table 13 (continued)
Parent-Teacher Interviews 1, 2 and 3

Question 7: Does (child's name) have other kinds of problems? (May give more than one answer. Did not ask parents on second and third interviews.)

Interview Person and No.	N	NR	No None	No and Explain	Yes	Yes Academic	Yes Social	Yes Personal
1	16							
Teacher		2	7			4	2	1
Parent			7			2		7
2	16							
Teacher		7	6			2	1	
3	8							
Teacher		1	6			1	1	

Question 8: Has his speech ever improved? or been better? (Did not ask on second and third interviews.)

Interview Person and No.	N	NR	Do Not Know	No or Same	No Worse	Yes Better	Yes and Explain	Varies
1	16							
Teacher		7	7			1		1
Parent		2		2	2	8		2

Question 9: What do you think have been the effects of the therapy program? (Did not ask on first interview. May give more than one answer.)

Interviews Person and No.	N	NR	None	None and	Yes Little	Yes Some	Yes Much	Yes More Talk	Yes Imp. Aca.	Yes Imp. Soc.	Yes Imp. Att.
2	16										
Teacher		7	1		3	1	1			1	1
Parent		2	3		1	3	6				1
3	8										
Teacher						2	3	2	1	1	3
Parent						4	4	2			2

Question 10: How would you rate his amount of talking in the classroom? Asked only Teachers)

Interview Person and No.	N	NR	1	2	3	4	5
1	16						
Teacher		3	1	3	4	4	1
2	16						
Teacher		6		2	3	5	
3	8						
Teacher		1		1	3	2	1

both the parents and the teachers, most of the subjects did not show avoidance.

Question five attempted to answer how much and what kind of help parents and teachers had given or were giving the subjects. The most common response was "Nothing." Parents more frequently than teachers responded to this question by indicating that they gave their children advice about how to talk better.

Question six about cause of stuttering revealed that most teachers did not know, whereas most parents ascribed the problem to the occurrence of a specific event such as an accident or imitating other people, etc. It is of interest that only three teachers suggested the home was the problem and only one parent suggested the school environment caused the stuttering.

Question seven was to find out if the subjects had other problems besides stuttering. According to the parents and teachers, most of them did not, with the exception of the seven parents who described various personal problems which their children had. Most of these had to do with personal traits such as being stubborn or pouting, etc.

Question number eight tried to assess the variability of the problem over the subject's life. Most of the parents reported that their children had become better in the past few years.

Question number nine concerned improvement as a result of the training program. Most of the teachers who answered this item reported they thought the subjects were talking better. Ten of the parents reported improvement ranging from "some" to "much." The most positive responses were found for those eight subjects who had been through the Transfer Program. In the third interview both parents and teachers agreed there had been improvement in speech and other areas. Both parent and teacher reports tended to correlate with the NSS data but not as well with CT and SI information.

The final question, number ten, was asked of teachers only. The answers revealed that the subjects in this study tended to do an average amount of talking as compared to other children in the classroom. There was not much change over the three interview periods.

Subject Interview.

The results of the subject interviews are shown in Table 14. The subjects were asked similar questions, with a few exceptions, to those asked the parents and teachers.

Question one was to find out how the subjects talked about their speech and whether or not they were aware of their speech problems. In the first interview 15 subjects talked about stuttering behavior and nine actually used the word, "stuttering," although it was not used in the question. Three subjects

Table 14
Subject Interviews 1, 2 and 3

Question 1: Do you ever have trouble talking? Tell me about it.

Number	N	NR*	No	Yes, Describe Other Problem	Yes, Describe Stuttering	Yes, Used the Word "Stuttering"
1	16			1	6	9
2	16		3		5	7
3	8		4		3	1

Question 2: Are some times better than others? Tell me about it. (May give more than one answer.)

Number	N	Do Not Know	No Same	Yes Morale	Yes Places	Yes Situations	Yes People	Yes Not Nervous	Yes Change Speech
1	16	2	4	1	4	1	3	3	3
2	16	1	4	1	3	2	2	2	1
3	8	1	2		1	2	2		

Question 3: Do other children or adults ever say anything about your talking? (May give more than one answer.)

Number	N	No	Others Ask	Children Tease	Adults Give Advice
1	16	4	4	7	5
2	16	9	2	2	4
3	8	4			4

Question 4: Are there ever times when you don't talk even though you want to? (May give more than one answer.)

Number	N	No	Yes	Sometimes	Start and Stop	At Home	At School	Yes Other
1	16	3	2	3	4	1	1	2
2	16	8	7	1				
3	8	5	2	1				

Question 5: Are there things that you do to help yourself talk better? (May give more than one answer.)

Number	N	No	Think About What to Say	Slow Down	Do Not Talk	Practice	Take Breaths	Stop and Do Over	Other
1	16	4	2	5	2	1	2	1	1
2	16	2	3	5		4		1	2
3	8	1	3	1		2		1	1

*No Response

Table 14 (continued)
Subject Interviews 1, 2 and 3

Question 6: What causes your talking problem?
(Asked only on first Interview.)

Number	N	NR	Do Not Know	Event	Talk Too Fast	Get Excited	Forget Things
1	16	1	7	3	2	2	1

Question 7: What did you think of your speech training?
(Asked only on second and third interviews.)

Number	N	Do Not Know	Did Not Like	Did Not Like But It Helped	Liked It	Liked It and It Helped
2	16	1	1	1	6	7
3	8			1		7

responded with a "no" answer in interview #2. Four of the eight subjects indicated in interview #3 that they no longer had difficulty.

Question two which attempted to assess variablility found that stuttering varied with places, situations and people. The responses were different for each subject. There were no major changes in the responses to this item over the three interviews.

Question three about other's response to the subjects' speech revealed that other children teased, whereas adults were more prone to give advice about talking differently. This state of affairs changed on interviews #2 and #3 with the subjects reporting that fewer people were responding to their speech.

Question four about avoidance drew a slightly different answer from the subjects than it had from their parents and teachers. Thirteen of the subjects reported avoidance at home or school (only a few parents and teachers had reported avoidance). There was a decrease in reports of avoidance in interviews #2 and #3.

Question five was to determine how much the subjects were doing to help themselves. The results of this question revealed that most of the subjects did things to help themselves. These self-help activities ranged from thinking about what to say to swallowing (other). There was not much change in the answers in the next two interviews indicating that the subjects may not have really learned to verbalize or describe what it was they had to do to speak fluently, i.e., the DAF #2 program subjects did not answer with, "Use my pattern," nor did the P#3 program subjects say, "Stop after every stuttered word," etc.

Question six concerning causation revealed that half of the subjects did not know and the other half listed a wide variety of things. Some of their answers reflected those of their parents, especially when the answer concerned a specific event such as a fall.

Question seven about improvement and help from the program revealed that most of the subjects had liked the program and felt they had been helped by the procedures.

Clinician Interview.

In the Spring the clinicians were interviewed about the project. The results of this interview are shown in Table 15.

Question one about rating various project activities revealed that the clinicians generally rated these as good to excellent. Their rating of the changes in the subjects' speech and effectiveness of the programs was related to the program performance, i. e., whether or not the subject had completed

Table 15
Clinician Interview

Question 1: How would you rate the following?

	Poor	Fair	Adequate	Good	Excellent
Training				1	7
Supervision					8
Establishment Program per Child		1	1	7	5
Transfer Program per Child		2		1	5
Change in Speech per Child	1	1	2	8	2
Child's Response to Establishment		5	2	4	3
Child's Response to Transfer		3	1		4

Question 2: What five comments would you make about the Establishment Program?

PT #1		DAF #2		P #3		GILCU #4	
Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg
3	5	6	2	6	1	2	1

Question 3: What five comments would you make about the Transfer Program?

DAF #2		P #3		GILCU #4	
Pos	Neg	Pos	Neg	Pos	Neg
5	0	5	0	2	1

Table 15 (continued)
Clinician Interview

Question 4: How would you change the training of the clinicians?

None	More General	More Counting Stuttered Words	Transfer Practice
4	3	1	1

Question 5: What were your major problems in running the Establishment Program?

Absenteeism	None	Counting Stuttered Words	Instructions (PT # 1)
3	1	3	1

Question 6: What were your major problems in running the Transfer Program?

No Response	None	Parent Cooperation	Organization
4	1	2	1

Question 7: How do these programs compare with other stuttering therapy you have done?

No Response	More organized and effective
1	7

Question 8: Do you think the programs work? Yes 8 No 0

Question 9: Would you use the program next year? Yes 6 No 2 (PT # 1))

Question 10: How would you rate your skills ?

	Poor	Fair	Adequate	Good	Excellent
Counting stuttered words		1	2	4	1
Timing			1	1	6
Administration of Establishment Program			1	5	2
Administration of Transfer Program			1	3	1
Recording Data		1	2	2	3
Administration of Criterion Tests			2	1	5

Table 15 (continued)
Clinician Interview

Question 11: Do you have any additional comments about the project?

NR	Liked it	Need more practice	Good Supervision and Help	Learned
2	1	1	1	3

the program. Questions two and three evoked more positive comments than negative ones. The answers to question four indicated that the training was adequate and the clinicians had only minor suggestions for improvement. Question five answers suggested that the clinicians had the most trouble with absenteeism and counting stuttered words. Question six evoked a variety of responses. Question seven answers indicated that the clinicians thought the programs were better than what they had been doing. Question eight answers indicated that the clinicians believed the programs worked and several made reference to the data they had collected to support this observation. Question nine evoked the response that six of the eight would use the programs again. The two who would not had been using the PT #1 program. The rating of their skills in Question ten generally agreed with BSI staff rating. Question eleven elicited all but one positive statement.

There were three more questions asked on the interviews. One concerned the easiest part of the program for the clinicians to which they gave eight different answers. Another asked them to state the hardest part of the program. It also evoked eight different answers. Some of the clinicians mentioned scheduling and changing schools rather than program problems per se. The third question asked for suggestions concerning improvement of the programs and the answers to this question were different for each clinician.

The overall evaluation of this interview was that the clinicians looked favorably on the project, felt it had been helpful to them and the subjects. The clinicians were realistic in their positive assessment of themselves, the varying programs and the progress the subjects had made.

Miniature Delayed Auditory Feedback Apparatus

In the Spring of the project year the miniature delayed auditory feedback equipment was ready for testing. It was 5-1/2" by 1-1/4" by 3" and weighed 12 ounces. A small microphone and one ear piece are attached. It delivers a 50 milisecond delay. It was tested on the four subjects who had been in the DAF #2 program, although all of them had completed the DAF #2 Program several months before the test. The test consisted of having the subjects engage in monologue for two minutes without the equipment, two minutes of monologue with it, and then two more minutes of monologue without it.

The results in SW/M and WS/M are shown below for the four subjects.

Subject	Before		With DAF		After	
	SW/M	WS/M	SW/M	WS/M	SW/M	WS/M
O.J.	2.5	130.0	2.5	114.0	6.0	131.5
B. K.	.0	97.5	.0	89.5	.5	82.5
R.S.	.5	141.0	.5	122.5	2.5	127.0
P.W.	1.0	101.0	2.0	106.5	1.0	91.5
Mean	1.0	117.3	1.3	108.1	2.5	108.1

The miniature delayed auditory feedback had little effect on SW/M, but it did produce lower speaking rates especially for B. K. and R. S. An increase in stuttering rate in the "after" sample occurred in three of four subjects. They were then asked three questions:

---

1. Did the little DAF machine seem like the big one?
2. Did the little DAF machine help them talk better?
3. Would they be willing to wear the machine at home and/or at school?

All four reported that the little DAF sounded very much like the big one. They all felt it was helpful. They said they would wear the machine at school and/or at home.

Final Analysis and Comparison of the Four Establishment Programs

For this final analysis and comparison of the programs only the data from those subjects (N 13) who completed one of the four Establishment Programs are presented and analyzed. The results of the initial and final SI, CT and NSS in SW/M and run time in hours in the Establishment and Transfer Programs, are presented in Table 16.

As can be seen in Table 16, only two of four subjects completed PT #1; however, one of those who did not complete was absent quite often. All four of the subjects completed the DAF #2 program. Only three of the four subjects completed the P #3 program; however, one subject dropped out and it is not known whether or not he would have completed had he stayed in the program. All four of the subjects completed the GILCU #4 program. One dropped out after completing the program.

The P #3 group was highest in SW/M on SI #1. The PT #2 and DAF #2 groups were comparable and the GILCU #4 group was the lowest. The GILCU #4 group performed the best on the post program SI (#2 or #3), followed by PT #2 and DAF #2.

The groups were spread somewhat on CT #1 with the P #3 group the highest and the PT #1 group the lowest. The groups were compared on the post CT (#2 or #3). The DAF #2 group was the highest. A Kruskal-Wallis one-way analysis of variance on CT #2 or CT #3 indicated that there were significant differences ($H=8.78$, $p < .05$). However, this is to be evaluated remembering that only two DAF #2 subjects completed the Transfer Program.

On the pre NSS-Home the groups were comparable with the exception

Table 16

N, Means and S.D. of SW/M for SI #1, SI #2 or #3, CT #1, CT #2 or #3, NSS Home and School (Pre and Last Sample) and Hours in Establishment, Transfer and Establishment and Transfer for the 13 Subjects Completing Programs PT #1, DAF #2, P #3 and GILCU #4.

Program	N	SI #1 SW/M	SI #2 or SI #3 SW/M	CT #1 SW/M	CT #2 or CT #3 SW/M	NSS Home Pre SW/M	NSS Home Last SW/M	NSS School Pre SW/M	NSS School Last SW/M	Session Estab. Hours	N	Session Transfer Hours	N	Session Estab. and Transfer Hours
PT #1														
Sum	2										0		2	
Mean		6.9	.9	4.8	.5	8.3	2.1	5.2	.8	17.9		0		17.9
S.D.		2.4	.4	.4	.1	5.7	1.8	.9	.8	3.2				3.2
DAF #2														
Sum	4										4		4	
Mean		6.8	1.8	6.4	1.5	8.0	1.9	3.3	2.5	6.0		9.9		15.9
S.D.		2.6	1.5	1.4	.9	2.2	1.2	.7	1.3	2.6		2.1		-
PT #3														
Sum	3										1		3	
Mean		8.1	3.4	8.3	.5	13.2	2.5	9.7	5.2	14.4		6.5		20.9
S.D.		3.7	4.5	3.5	.4	4.4	2.1	3.7	3.5	8.5		-		-
GILCU #4														
Sum	4										3		4	
Mean		4.4	.3	5.9	.15	7.0	1.3	3.7	.6	9.6		6.4		16.0
S.D.		1.5	.2	1.0	.1	4.9	1.4	.7	.6	3.5		.9		-

of the P #3 group which was the highest. On the post NSS-Home the groups were spread somewhat with the DAF #2 and GILCU #4 groups being similar and lower than the PT #1 and P #3 groups.

On the pre NSS-School, the DAF #2 and GILCU #4 groups were similar and lower than the PT #1 and P #3 groups. On the post NSS-School, the PT #1 and GILCU #4 groups were the lowest. The DAF #2 group demonstrated only slight change. The P #3 group demonstrated fairly large change, but their final SW/M was still relatively high.

The DAF #2 group completed the Establishment Program in the shortest time, followed by the GILCU #4, P #3 and PT #4 groups. The GILCU #4 group finished the Transfer Program in the least amount of time. The Transfer Program run time for the one P #3 subject was equal to the GILCU #4 group. Only two of the four subjects from the DAF #2 Establishment Program finished the Transfer Program. The DAF #2 group demonstrated the least number of total hours of program training (Establishment and Transfer) followed by the GILCU #4, PT #1, and P #3 groups.

This analysis indicated that the P #3 group contained subjects who demonstrated consistently higher pre program SW/M rates. The DAF #2 group ran the fastest in the Establishment Program (although two did not complete the Transfer Program) and the GILCU #4 group had the lowest post program CT, SI, and NSS SW/M rates (they also had the lowest pre program rates). There is some evidence as exemplified by the GILCU #4 group performance that those subjects who went through the Transfer Program demonstrated lower SW/M in the NSS, which suggests the value of the Transfer Program for producing carryover of fluent speech to normal speaking settings.

SUMMARY

The four Establishment Programs (PT #1, DAF #2, P #3 and GILCU #4) were run on 16 subjects by eight speech clinicians in a public school setting. The one Transfer Program was run on the eight subjects who completed one of the Establishment Programs. Pre and post tests (CT and SI) were given to the subjects. Samples (NSS) were collected of the subjects' speech in their home and school environments. These data were analyzed in terms of stuttered words per minute (SW/M), words spoken per minute (WS/M) and percent of stuttering. Numerous reliability probes were conducted on counting stuttered words, total words spoken and timing talking. The programs were analyzed in terms of total session hours, talk time hours (subjects' actual talking time) and percent of talk time (talk time divided by total session time expressed as a percent). These data will now be applied to meeting the specific objectives of the first year of the project:

1. Refine the Programs Including Both the Formats in Which They Were Written and Certain Operational Characteristics.

The programs were first prepared in written program scripts.

These were revised on the basis of clinicians response. They were "equated" on certain variables (e.g., minimal run time, tokens) and their unique characteristics were "highlighted" (e.g., the DAF #2 Program employed a DAF machine, the P #3 Program employed a signal light box, etc.). The data collected this year suggested that some changes would be beneficial. The PT #1 Program would probably run better if the criterion levels were lowered. However, there is evidence that younger subjects may have great difficulty in identifying stuttered words in this program even with the lowered criterion levels. The DAF #2 Program probably would run better if the subjects were patterned at a higher rate (40 WS/M) in the Establishment Program and greater effort expended to gradually increase their word rates during the Transfer Program. The P #3 Program tends to run the longest of the four programs which may be due to criterion levels or the nature of the program itself. The GILCU #4 program would probably run better if the criterion levels were lowered in four steps.

2. Develop a Natural Speech Sample Process (NSS) to Collect Samples of the Subjects' Spontaneous Speech in the Home and School Settings.

The first part of this was accomplished through having the parents make tape recordings at home for the home speech samples. This seemed to work well except that some parents were not consistent especially toward the end of the year. The tape recordings generally were clear and encompassed a wide variety of speaking experiences. The SW/M computed from these recordings indicated that they were reasonable samples of the subjects' speech when compared with their performance on other tests and NSS at school.

The second part of the NSS process was accomplished through the project staff, trained volunteers and teacher and subject cooperation. The subjects were willing to wear the portable microphone equipment and did so. The quality of the recordings was good. The major problems were in scheduling and the relatively long length of the sample necessary to obtain a few minutes of the subjects' talking. The school samples required a great expenditure of time to both collect and analyze the sample. The redundancy of the data suggest that fewer samples might provide as much information with much less cost in time and energy. The most important times (where the major changes occur) to collect samples are at the beginning of the program, near the completion of the Establishment Program and near the completion of the Transfer Program, although in some cases the changes were gradual throughout the programs.

3. Collect Data on the Programs With the Possible Outcome That One Or More of the Programs Would Not Be Tested the Second Year.

The data collected this first year on the program operation produced the following findings:

1. All four programs were similar in that they all produced improved fluency on the intra-program CT and the extra-program SI.

2. The programs varied mostly in their length of operation from 6.0 hours in DAF #2 to 9.9 hours in GILCU #4 to 14.4 hours in P #3 to 17.9 hours in PT #1 (although this observation is somewhat tempered by the severity - high initial SW/M rate - of the subjects in P #3 group).

3. The completion of any one of the Establishment Programs produced improvement in NSS, or external program fluency.

4. The completion of the Transfer Program produced still further changes in fluency in the NSS situations.

5. The clinicians learned all four programs and ran them well.

6. The major clinician error was incorrectly counting stuttered words during the program. This error was distributed across all four Establishment Programs.

7. All four of the Establishment Programs could be improved by changing certain characteristics. PT #1 requires the most extensive changes and GILCU #4 the least. It is not clear how to improve the P #3 program.

8. Interviews conducted of subjects, their parents and teachers and the clinicians who ran the programs generally correlate with the other data of the project.

In order to select the programs to continue to test in Year 2, the most important variables were run time and subject performance in the Transfer Program. These are related in that selecting programs which run faster will permit the use of and further testing of the Transfer Program. The two fastest running programs were DAF #2 and GILCU #4. The data from this project and previous experience (Ryan and Van Kirk, 1971; 1974) and data about these two programs suggested that we continue to test only these two programs. This provided an opportunity to further test the Transfer Program. This procedure appeared to offer more information about effective fluency training programs for stuttering children than attempting to refine the other two programs to the point where they might equal GILCU and DAF in run time. Therefore, only the DAF #2 program and GILCU #4 Establishment Program and the Transfer and Maintenance Programs were to be tested in the second year of the project. If severity (rate of SW/M) was a confounding variable, (related to run time)it should surface in Year 2, perhaps even more noticeably because the number of programs (hence program variables) were to be decreased.

4. Collect Data on the Clinicians' Ability to Carry Out the Programs.

The first source of the data to answer this question was in the measurement of the change of the subjects' fluency. This did occur, hence there is evidence that the clinicians ran the programs accurately. On site observations revealed that clinicians made occasional errors in carrying out a step. These errors were distributed across all programs and sometimes represented BSI staff

teaching errors or intra-program script errors rather than clinician mis-administration. The major problem for all clinicians across all four Establishment Programs was counting stuttered words correctly while in the program. Even with this error all of the subjects did well except for those subjects who passed final program steps with the clinician under counting stuttered words. These subjects could not pass the CT with the project supervisor counting stuttered words correctly. The data and observations generally suggest that the clinicians were able to carry out the programs in the public school setting.

The four Establishment Programs were tested, the data collected and analyzed, and the purposes of the first year of the study were met.

INTRODUCTION, YEAR 2, 1973-74

The results of the first year suggested that only two of the four programs, GILCU and DAF, be tested in the second year. Except for minor changes which will be described, the objectives and procedures for Year 2, 1973-74, were similar to Year 1.

Project Objectives

The general objectives were to use, contrast and demonstrate fluency programs that can be used successfully in the public school setting.

The specific objectives were: 1) Compare two programs (GILCU and DAF) for establishing fluency; 2) Collect additional data on the operation of Transfer and Maintenance Programs; 3) Test a revised Natural Speech Sample (NSS) process and 4) Collect additional data on the clinicians' ability to carry out the programs in the public school setting.

PROCEDURES

Programs

The GILCU and DAF programs were very similar to those used in the first year and described before (See Table 1). Minor changes in the GILCU Program included reducing the number of steps from 60 to 54, changing the consequences for stuttering from the verbal, "slow down," to "stop," and reducing the criterion in steps 7-10 from 10 to 5. Minor changes in the DAF Program included training the clinicians to teach the pattern at 40 words spoken per minute using, "Stop, use your pattern," in place of "Use your pattern," contingent on stuttered words and rewording the initial steps in the Branch Index. The results of the first year had suggested all of these changes in order to make the programs more functional. The Transfer Program was modified in that the home series preceded the school series and the clinician did all of the home series rather than training the parent to do it. The Maintenance Program remained the same.

Site, Subject, Clinician and Program Selection

Three different public school districts were chosen on the basis of size (10-20 clinicians), distance from Monterey (150 miles maximum), availability of subjects, and interest in cooperating in the project. The first three sites contacted (San Jose, population 400,000; San Louis Obispo, population 25,000; Palo Alto, population 80,000) agreed to cooperate and were able to find enough subjects.

The subjects were selected from referrals by the clinicians. The same criteria as for Year 1 were used. From the 44 subjects screened, the final 24 subjects (8 per site) were chosen. It was necessary to replace two of the subjects during the year, one for an attendance problem and one for a behavior problem.

The four clinicians from each site (12 clinicians total) were chosen on the basis of interest in the project and availability of subjects. In most situations each clinician had at least one child who stuttered already in the schools she was serving. Each clinician was assigned two children in varying combinations of elementary-elementary, junior/senior high-elementary and junior/senior high-junior/senior high. Seven of the 12 clinicians had to serve schools which were not part of their regular assignment. At each of the three sites, two clinicians were paired with two subjects each on the basis of the screening test results of the subject's stuttering rate and an equal number of elementary and junior-senior high subjects. One of the two Establishment Programs (GILCU or DAF) was randomly assigned to each pair of clinicians in each site. All clinicians ran the same Transfer and Maintenance Programs.

Training and Monitoring of Clinicians

A three-day training program (15 hours of actual training on the program) was held at each of the three sites during September and October. The training employed program operation manuals. The training included identification of stuttered words using both audio and video-taped pre-counted samples, administration of the Criterion Tests, one of the two Establishment Programs, the Transfer Program and the Maintenance Program. Two of the clinicians received additional re-training (5 hours) on identification of stuttered words and DAF Program operation in December.

The clinicians were monitored by the project supervisor on a tri-weekly basis in the Fall, and a monthly basis in the Winter and Spring. Monitoring was done by live observation. Corrective feedback about the adequacy of program operation and help with difficult children or special problems were given. Monitoring was also done of tape-recorded sessions in addition to live monitoring. A final form of monitoring occurred in the analysis of data turned in by the clinicians. A special monitoring form covering identification of stuttering, program administration, timing, talk time efficiency, and data computation was devised and used in each of the live or tape

monitored analyses (See Appendix).

Program Operation Schedule

The procedures for Year 2 were essentially the same as for Year 1. The only exceptions were that the clinicians started therapy earlier (around October 1st, rather than November 1st) and they were given an attendance policy at the beginning to make up any missed sessions.

Ancillary Activities

Parent informed consent procedures, teacher-administrator contact and volunteer staff selection were the same as Year 1. Dr. George Shames of the University of Pittsburgh made an on-site consultation visit to the project on January 10 and 11, 1974.

Evaluation

Tests.

The Stuttering Interview (SI) and Criterion Tests (CT) were administered and analyzed in the same way as in Year 1. There were two changes on the CT procedures. The first was that the clinicians instructed the subject to "Use his pattern" or "Speak fluently" only on CT #2. The second was that the project supervisor attended only the first CT #1 session. The stuttered word count of the project supervisor (live in CT #1, off tape recordings in CT #2 and CT #3) was used in data analysis and in the decision as to whether or not a subject had met criterion on CT #2 and CT #3. However, this latter operation was modified with the rule that the clinicians' count, if within 4 stuttered words of the count of the project supervisor per mode, would be used to determine pass or fail on CT #2 and CT #3.

Natural Speech Samples.

The Natural Speech Sample (NSS) process was modified during Year 2. Only three such samples were commonly taken during the year: one before the Establishment Program, one after the Establishment Program and one after the Transfer Program. In a few cases a fourth sample was also taken due to the length of time elapsed between NSS #3 and the end of the school year. The home sample was tape-recorded by the parent in the home with the subject and one other person in attendance. The school sample was tape-recorded by the teacher in an empty classroom with the subject and one other person in attendance. The samples consisted of conversation for a total of 15 minutes, out of which the first 5 minutes were selected for analysis.

Measures of Verbal Output.

These were the same as Year 1. In addition, a special topographical

analysis was made of the speech of six selected subjects from SI #1.

Reliability and Accuracy of Counting and Timing.

In general the same procedures used in Year 1 were used in Year 2. There were several modifications in the stuttered word count procedures. Only eight randomly selected SI's were used to compare the counts of the project supervisor and the project director. This procedure resulted in a total mean percent agreement of 93.5 with a S.D. of 2.4.

The CT stuttered word count procedures were changed in several ways. First, a live count was possible on only CT #1. The counts on CT #2 and CT #3 were done live by the clinician and off tape recordings by the project supervisor. The CT comparisons may be of either total counts for reading, monologue and conversation or they may be an average of each of the three counts. An analysis was done both ways. Finally, in order to more accurately reflect the counting accuracy of the clinicians when the counts were low, it was decided to arbitrarily score counts which were within one of each other as 90 percent, i.e., if observer #1 (clinician) counted 2 stuttered words and observer #2 (project supervisor) counted 1 stuttered word, this was considered 90 percent agreement rather than the arithmetic 50 percent.

The monitoring procedure used in Year 2 provided another measure of the accuracy of counting stuttered words. The results of this procedure will be reported in the RESULTS section under Clinician Performance.

Seven different people including the project director and project supervisor were involved in word counting. The results of 15 different probes revealed percent agreement of a mean of 91.7 with a S.D. of 7.6 percent.

A measure of the accuracy of timing by the clinicians was designed into the monitoring procedure and will be reported in the RESULTS section under Clinician Performance. The time recorded by the project supervisor was used in data analysis of CT performance. A probe of 10 CT #1, #2, and #3 time samples revealed percent agreement of a mean of 96.1 with a S.D. of 2.3. Timing errors were equally divided between over and under timing and averaged .8 minutes per 15 minute talking time sample. In the average worst possible situation of under counting stuttered words and over timing, this yielded a .3 SW/M variation. Commonly, the clinicians under counted stuttered words and either over or under timed. This would yield an average discrepancy of .17 SW/M per 15 minutes of talking time. This amount of error is minimal.

Interviews

Interviews of the subjects were conducted by the project supervisor and their parents and teachers were interviewed by the clinicians. The clinicians also filled out a questionnaire evaluating the project.

Maintenance and Follow-up of Four Subjects From Year 1

The four subjects who passed CT #3 from Year 1 were put on the Maintenance Program during the Summer and early Fall of Year 2. When they completed that program they were put on follow-up which consisted of three quarterly checks of their speech on the video-taped SI, NSS and parent, subject and teacher interviews. In addition, the nine subjects who still resided in the area were contacted for futher therapy and six of these subjects received additional fluency training on the GILCU Program with transfer and maintenance activities.

RESULTS

Subject Pre Program Performance

The subjects were 20 males and four females ranging in age from 7 to 17 with a mean age of 11.7 years. All were enrolled in either public or parochial schools at either the elementary or junior/senior high school level. In Table 17 are shown the entering, pre program performances of the 24 subjects on the first SI, CT and NSS. These data are shown for both groups, GILCU and DAF.

The two groups were comparable in age and their performances on the various samples of stuttering behavior. A Kruskal-Wallis one-way analysis of variance between the two groups on SW/M on the CT indicated no significant difference between the two groups ($H=.4$, $p>.05$). There were very little differences among the four samples for either group. This observation is different from the finding in Year 1 that there were great differences between NSS and SI/CT performances. This reflected the difference in procedures in the NSS process in Year 2 in which these samples were more structured, hence more similar to the SI and CT.

A series of correlations among the various samples in SW/M revealed the following correlations:

Screen and SI	.74*	SI and NSS-S	.83*
Screen and CT	.71*	CT and NSS-H	.61*
SI and CT	.91*	CT and NSS-S	.84*
SI and NSS-H	.65*	NSS-H and NSS-S	.71*

*All significant at .01

The highest correlation was between the SI and the CT. The lowest correlations were between the SI or CT and NSS-Home. All of the correlations were higher for Year 2 than for Year 1. This was due to both the larger N (24 vs. 16) and the similarity of the NSS procedures to the CT and SI tasks.

Table 17

Means and Standard Deviations for Age, SW/M, WS/M and Percent for the Stuttering Interview (SI #1), Criterion Test (CT #1), Natural Speech Sample-Home (NSS-H#1), and Natural Speech Sample-School (NSS-S#1) for 24 Subjects in the Two Establishment Programs: GILCU (N 12) and DAF (N 12).

Program	Age	SI #1			CT #1			NSS-H#1			NSS-S#1		
		SW/M	WS/M	Percent	SW/M	WS/M	Percent	SW/M	WS/M	Percent	SW/M	WS/M	Percent
GILCU #1													
Mean	11.8	8.3	107.8	7.7	7.5	113.0	6.6	7.8	106.0	7.3	8.3	108.3	7.7
S.D.	3.1	6.0	20.3	7.4	5.7	28.7	6.3	6.4	18.8	5.7	6.3	19.7	5.6
DAF #2													
Mean	11.6	7.4	111.0	6.7	7.6	112.1	6.8	7.0	103.6	6.8	7.5	116.2	6.5
S.D	2.5	5.0	10.0	3.0	3.9	20.1	3.3	3.2	24.4	3.5	4.5	29.7	5.0
Total													
Mean	11.7	8.0	109.4	8.0	7.5	112.6	6.7	7.4	104.8	7.1	7.9	112.3	7.0
S.D.	2.8	5.4	16.1	6.0	4.8	24.2	4.9	4.9	21.9	4.6	5.4	25.1	5.2

In Table 18 is shown the analysis of stuttering behavior by school level and program group. The most severe stutterers were in the GILCU Junior-Senior high group. This group contained two severe subjects who averaged 20 stuttered words per minute. The least severe were in the GILCU Elementary group. The total Junior-Senior group was composed of more severe stutterers than the Elementary group.

An analysis by site indicated:

Site #	SI #1 SW/M	WS/M	Percent
1	6.0	106.1	6.1
2	10.1	118.1	8.0
3	10.1	104.3	8.8

Site #1 had the group of least severe stutterers whereas sites #2 and #3 had more severe stutterers and were comparable to each other.

A case history was taken on each subject by each clinician. The major results of this case history are summarized below:

Group	Grades Mdn	Rng	Number in Family Mdn	Rng	Previous Therapy Months Mdn	Rng	Personal Problems Number of Subjects
GILCU	C	C-A	5	3-10	5	0-45	4
DAF	B	D-A	6	5-9	0	0-54	6
Total	C	D-A	5	3-10	1	0-54	10

There were no obvious differences between the two groups.

Analysis of the Two Establishment Programs

The pre and post test results and program performance of the 20 subjects who completed one of the two Establishment Programs (DAF or GILCU) are shown in Table 19.

Table 18

Means and Standard Deviations of: Stuttered Words Per Minute (SW/M), Words Spoken Per Minute (WS/M) and Percent for Elementary and Junior-Senior High Groups in the Stuttering Interview (SI #1) for GILCU and DAF Programs.

Group	N	SW/M Mean	SW/M S.D.	WS/M Mean	WS/M S.D.	Percent Mean	Percent S.D.
GILCU Elem.	6	7.1	3.0	103.1	21.0	7.3	4.0
GILCU Jr/Sr	6	9.5	8.2	112.6	20.3	9.8	10.0
DAF Elem.	6	8.1	3.0	106.2	7.7	7.3	3.0
DAF Jr/Sr	6	7.1	4.5	116.0	10.4	6.1	4.0
All Elem.	12	7.4	3.0	104.6	15.2	7.3	3.0
All Jr/Sr	12	8.3	6.4	114.1	15.4	8.1	8.0
Total		8.0	5.1	109.4	16.1	8.0	6.0

Table 19

N, Means and Standard Deviations of: Stuttered Words Per Minute (SW/M) in the Stuttering Interviews (SI), Criterion Tests (CT), Natural Speech Samples (NSS) and the Two Establishment Programs; Words Spoken Per Minute (WS/M) in the Two Establishment Programs; and Total Session Hours, Talk Hours and Calendar Days for 20 Subjects Who Completed One of the Two Establishment Programs (GILCU or DAF).

Program	N	SI#1 Pre SW/M	SI#2 Post SW/M	CT#1 Pre SW/M	CT#2 Post SW/M	NSS#1 Home Pre SW/M	NSS#2 Home Post SW/M	NSS#1 School Pre SW/M	NSS#2 School Post SW/M	Session Hours	Talk Hours	Percent Talk Time	Program SW/M	Program WS/M	Calendar Days
GILCU	9														
Mean		6.4	1.5	6.0	.5	5.3	1.3	7.0	2.1	7.8	3.7	47.4	.6	138.8	75.2
S.D.		5.0	3.1	4.9	.1	2.6	.7	4.7	3.2	1.8	1.2	8.3	.3	28.9	25.8
DAF	11														
Mean		7.0	4.7	7.5	.3	6.8	4.1	7.1	4.3	8.0	3.5	44.2	.4	70.2	86.7
S.D.		3.6	4.7	4.1	.2	3.2	3.8	4.5	5.2	3.2	1.4	10.7	.3	31.1	50.8
Total	20														
Mean		7.0	3.3	6.8	.4	6.1	2.9	7.1	3.3	7.9	3.6	46.2	.5	104.5	80.9
S.D.		4.1	4.2	4.4	.2	3.0	3.2	4.5	4.5	2.3	1.2	9.5	.3	30.0	38.3

GILCU.

The program operated well. Nine of the 12 subjects who started the program finished it and passed CT #2. They all demonstrated improved fluency on both the CT (Criterion Test) and the extra program samples (SI, NSS-Home, NSS-School). However, all of the extra program samples indicated higher rates than the CT suggesting the need for further training in the Transfer Program.

The basic operational characteristics of the program were 7.8 hours of therapy (15, 30-minute sessions) with 3.7 talking time hours of the subjects yielding 47.4 percent talking time. The subjects demonstrated .6 stuttered words per minute, and 138.8 words spoken per minute in the program. The program required an average 75.2 calendar days (10.7 weeks) to complete. These data indicate that the GILCU Program was effective and efficient in establishing fluent speech.

Subjects Who Did Not Complete the Program. The three subjects who did not complete the program had various reasons for incompletion. All three needed branch steps (4, 7, and 13, respectively). Subject B. Y., male, age 9, moved through the program slowly (after 39 sessions he had completed only 34 steps out of the 54 in the program). His stuttering behavior was hard to count and he demonstrated a relatively high rate of stuttering (9.3 SW/M on CT #1). He moved from the area before CT #2 could be obtained. However, he was passing steps, had not branched and possibly would have completed the program within the school year.

Subject J. A., male, age 11, demonstrated similar characteristics to Subject B. Y. (7.3 SW/M on CT #1). However, he completed 53 of the 54 steps in the program in 49 sessions and demonstrated improvement on SI #2 (3.9 SW/M), CT #2 (2.9 SW/M), NSS-H #2 (4.8 SW/M) and NSS-S #2 (5.6 SW/M). Had he passed the last step in the program to complete it, he probably would have had to recycle due to his high rate in the program (a mean of 1.4 SW/M).

Subject D.M., male, age 14, entered with the highest stuttering rate of both groups (19.2 SW/M on CT #1). He was on the program for 51 sessions and had been on branch steps for 22 of the 51 sessions. The program appeared to have little or no effect on his stuttering except for some improved fluency within some of the program steps.

From the performance of these three subjects it may be concluded that GILCU was not efficient for subjects with severe stuttering problems (high SW/M). Two of the subjects were making progress and might eventually have completed the program, but the time would have been extensive (estimated at 25-30 hours of therapy). The performance of the three subjects could be predicted by their high SW/M in the first few program steps. A third subject was not helped at all.

This conclusion is somewhat mitigated by the performance of subject C. B., male, age 14, who had the second highest stuttering rate (18.7 SW/M on CT #1), but did manage to complete the program (24 sessions) and pass CT #2 (.6 SW/M).

Recycle. If subjects could not pass CT #2, they were recycled through portions of the GILCU program. Previous experience had suggested about 25 percent recycling due to either severity of the subject or errors on the part of the clinician (Ryan and Van Kirk, 1974). Seven of the nine subjects (78 percent) had to recycle on the average of two times, commonly in monologue (9) and/or conversation (9). There are several explanations for this recycle phenomenon. The first is that the programs were run without home practice activities. Previous experience with the use of home practice did not show a high rate of recycle. The second explanation is that the criterion levels during the program were too low, that is, subjects could pass the program, but were not fluent enough to pass the post program CT #2. The third explanation is that the clinicians did not count, hence consequate, stuttered words accurately which meant that the subjects had not really passed the program steps. In order to gain information about the recycle problem, an analysis was made of the conversation step (C-18) for each of three subjects (low, medium and high stuttering rates) run by three different clinicians. The project director listened to the tape recording of these sessions and counted stuttered words. Step C-18 required the subject to converse for 5 consecutive minutes with no stuttered words (0 SW/M). The findings for the C-18 and the first CT #2 are found below:

Subject	C-18				CT #2 Conversation			
	Clinician		BSI		Clinician		BSI	
	#SW	SW/M	#SW	SW/M	#SW	SW/M	#SW	SW/M
A. L.	2	.2	14	1.4	12	2.4	13	2.5
S. B.	2	.3	3	.4	4	.8	6	1.2
C. B.	11	1.0	32	2.9	47	9.4*	62	11.8*

*The unusually high breakdown was partly due to a two-week lapse between C-18 and CT #2.

It may be observed that the clinicians consistently undercounted stuttered words, hence permitting the subjects to pass a step. The clinicians tended to count better on the CT. In one of the three counts, subject S. B., the BSI count (.4 SW/M) would have predicted that the subject would have passed CT #2, but he did not.

A similar analysis was made of the recycle of C-18 and the conversation portion of CT #2a and the results are shown below:

Subject	RC-18				CT #2a Conversation			
	Clinician		BSI		Clinician		BSI	
	#SW	SW/M	#SW	SW/M	#SW	SW/M	#SW	SW/M
A.L.	0	0	7	1.2	3	.6	3	.6
S.B.	1	.2	3	.4	5	1.0	4	.8
C.B.	0	0	3	.6	5	1.0	7	1.5

The results of this analysis are similar to, but more definitive than the first analysis. The clinicians undercounted during the program step, but counted more accurately during the CT. Based on program performance Subject S.B. should have passed CT #2a. He did not. All three subjects were recycled in conversation again.

An analysis of that performance is shown below:

Subject	RC-18				CT # 2b Conversation			
	Clinician		BSI		Clinician		BSI	
	#SW	SW/M	#SW	SW/M	#SW	SW/M	#SW	SW/M
A.L.	0	0	5	1.0	2	.4	4	.8
S.B.	1	.2	1	.2	2	.4	2	.4
C.B.	1	.1	7	.7	2	.4	4	.8

All three subjects passed CT #2b although there was still a difference in counting stuttered words between the clinicians and BSI staff on CT #2b for two of the subjects. It had been decided earlier that if clinicians passed subjects on CT #2 or CT #3 and were not off more than 4 stuttered words for any mode, this would be counted as a pass.

In summary it may be noted that clinicians consistently (8 out of 9 times) undercounted in varying amounts from 1-21 stuttered words during C-18. In only one case had the subject actually performed at 0 SW/M in C-18. Their counts were more accurate on CT #2 than on the program step, but still under (7 of 9). It is not clear whether or not the counting accuracy of the clinicians improved over the three runs of C-18. It is more clear that the subjects' performance improved on each recycle. The BSI program step count was predictive of the BSI CT #2 count in seven out of nine cases. The two "misses" were on S.B. for CT #2 and #2a. For the two subjects who did not have to recycle their program performances in SW/M were 0 and .3 respectively, which yielded CT performances of .3 and .2 SW/M, respectively. Recycle time averaged 4 sessions or (2 hours) per subject.

These data suggest that the clinicians under counted stuttered words and permitted the subjects to pass steps when they had not demonstrated 0 SW/M for 5 minutes and that this was responsible for the high frequency of recycle phenomenon. These data also suggest that the criterion levels of the program are predictive, hence appropriate for the CT. These data also support the observation that the clinicians undercounted stuttered words more often during program steps than during CT's. Finally, these data suggest that recycling is effective. However, casual observation and discussion with the clinicians suggested that recycling was repugnant to them and to the subjects.

DAF.

The program operated well. Eleven of the 12 subjects who started the program completed it and passed CT #2. The subjects' performance on the extra program tests (SI, NSS Home and School) indicated improved fluency but not to the extent shown by the GILCU subjects. This was due to the subjects' use of pattern during the pr gram and CT #2 which did not necessarily carry over to their extra program speech. A simple indirect measure of the use of pattern is word rate. Means of the words spoken per minute (WS/M) during the first, middle and last of the Establishment Program, CT, SI, NSS-Home and NSS-School are shown below:

Establishment						
First	Middle	Last	CT #2	SI #2	NSS-H #2	NSS-S #2
49.4	78.0	87.3	78.5	122.0	120.7	128.5

These data suggest that most of the subjects gradually speeded up their word rate throughout the Establishment Program, maintained their slow, patterned rate into CT #2 and then speeded up their rates (or returned to their normal rates) in the extra program samples (SI and NSS). Because all but one of the subjects (T.D.) demonstrated a decrease in stuttering rate from NSS #1 to NSS #2 it may be inferred that the pattern training had reduced stuttering rate, but the word rate indicated that they were either using pattern at higher speaking rates than in the program or were not using pattern at all. Direct observation (analysis of the tape recordings) of the extra program measures indicated very little obvious use of pattern.

The operational characteristics of the DAF Program were 8.0 hours of therapy (16, 30-minute sessions) with 3.5 hours of talking time yielding 47.4 percent talking time. The subjects demonstrated an average of .4 stuttered words per minute and 70.2 words spoken per minute during the program. The program required an average of 86.7 calendar days (12.3 weeks) to complete.

Pattern Training. Analysis of the first few sessions revealed that two of the

subjects had been patterned at less than 30 WS/M, six had been patterned between 30-50 WS/M, one had been patterned at 60 WS/M and two had been patterned at 79 and 106 WS/M, respectively. Eight subjects had been patterned within the 30-50 WS/M range or lower and three were patterned at higher rates. Six of the subjects demonstrated a gradual increase in word rate as they progressed through the program. Three demonstrated a decrease in rate in the middle of the program and then an increase in the end and two had shown an increase in rate in the middle of the program followed by a decrease in the end. Two of the 11 subjects (S.R. and L.S.) maintained low rates throughout. The group as a whole demonstrated the expected gradual increase, but there was much individual variation.

A qualitative analysis of the first program session (session #4) revealed that pattern had been established correctly in six subjects and incorrectly in six subjects. With nine subjects the clinicians had modeled correct pattern but three of these subjects gave back incorrect pattern and the clinicians did not correct it. One subject received an incorrect model, produced incorrect pattern and the clinician did not correct him. Four of the six DAF subjects who received correct pattern training completed the Transfer Program and passed CT #3, whereas only one of the six who received incorrect pattern training did so.

The relationship between rate of speaking and the quality of pattern is not consistent. Correct pattern may be established at high rates and incorrect pattern may be established at low rates. Also some subjects varied throughout the program using pattern inconsistently.

Despite the inconsistency in pattern training and pattern performance (as measured by word rate) all 11 subjects did pass Criterion Test #2 using various degrees of pattern behavior. Subjects varied greatly in their ability to assimilate pattern. There was also variation in the effect of pattern on the subjects' fluency. Four subjects were able to operate at 100 WS/M or more with or without pattern and still maintain their fluency on CT #2.

One Subject Who Did Not Complete the Establishment Program. Only one subject, (J.O.), did not complete the Establishment Program. He had demonstrated good pattern initially at 61 WS/M, but was not able to "hold it" due to clinician error and other factors. He needed 6 branch steps. Pattern training had a positive effect on his stuttering as evidenced by the reduction in both frequency and duration of his stuttering blocks. His CT #1 was 8.8 SW/M, CT #2 was 2.3, SI #2 was 5.1 SW/M; however, NSS-H #2 was 6.6 SW/M and NSS-S #2 was 8.4 SW/M, which indicates the need for better pattern training and the Transfer Program.

Recycle. Only four of the 12 subjects had to recycle (25%) which is to be expected with inexperienced clinicians on the DAF Program (Ryan & Van Kirk, 1974). One of these four was J.O. who recycled four times, three of them in conversation only. Subject X.C. also recycled four times. X.C. did not

use pattern, hence stuttered, and the clinician did not count stuttered words, thus allowing X. C. to pass program steps both without pattern and with stuttering. Consequently X. C. continued to fail CT #2. The last two subjects, K.T. and T.G., recycled only once and twice, respectively, in monologue and conversation. In the case of T. G. the recycle problem also appeared to be related to attendance problems. Recycle time was extensive for the two subjects who recycled four times, 6.0 and 7.4 hours respectively. Recycling in the DAF Program was due to both initial incorrect pattern and clinician under counting stuttered words.

Comparison of DAF and GILCU.

A Kruskal-Wallis one-way analysis of variance revealed no significant difference between the two groups on Criterion Test #1 ($H = 2.83$ $p > .05$) nor on Criterion Test #2 ($H = 2.0$ $p > .05$). Both programs worked very well in that 20 of 23 subjects were greatly improved in fluency in reasonable time periods. Pattern teaching and recycle problems were present, but did not prevent the 20 subjects from completing the programs and passing CT #2. These problems appear to be due to teaching-training-monitoring rather than to program construction.

The DAF Program was successfully completed by more subjects and more severe stutterers within an equal therapy time period to GILCU. Other general operational characteristics of the two programs were similar with the exception that the subjects performed at lower WS/M rates in DAF than in GILCU. This was due to the slower rate of pattern in DAF. The GILCU subjects demonstrated better fluency in the extra program measures which was partly due to less severe rates initially and the fact that they did not have a "pattern" to transfer to their outside speaking. What they had learned about fluent speaking in the program had been learned without any additional equipment or special way of speaking. It was more natural, hence more easily transferred.

A by-site analysis of the performance of GILCU and DAF is shown below:

Site	Program	N	CT #1	SW/M	Session Hours	Talk Hours	Percent Talk Time
1	GILCU	3	5.2	.6	7.2	3.6	50
2	GILCU	4	7.4	.7	7.9	4.3	54
3	GILCU	2	4.2	.4	7.2	3.0	42
1	DAF	4	6.8	.5	7.7	2.9	38
2	DAF	4	10.2	.4	7.7	3.7	48
3	DAF	3	4.9	.4	8.6	4.1	48

These data suggest that site 2 had the most severe stutterers, put them through the programs in a reasonable time period and was very efficient in doing it. Site 3 had the least severe stutterers and ran them with the least efficiency. Site 3 also had three of the four subjects who did not complete the programs or could not pass CT #2, although these were also three of the most severe subjects with two of them on GILCU.

Another comparison of the operation of GILCU and DAF on the elementary versus junior/senior high subjects is shown below:

Grade	Program	N	CT #1	SW/M	Session Hours	Talk Hours	Percent Talk Time
Elem	GILCU	4	4.2	.4	7.6	3.1	41
Elem	DAF	6	7.2	.4	7.4	2.9	40
Jr/Sr	GILCU	5	7.4	.7	7.4	4.4	59
Jr/Sr	DAF	5	7.9	.5	8.6	4.2	48

It can be seen that the two programs were generally equal for the elemementary school sujbects except that the DAF Program subjects were more severe. The programs were generally equal for the Junior-High school subjects except that the session hours were longer and the percent talk time less for the DAF Program group.

A final comparison is the performance of subjects from Year 1 with subjects from Year 2 on the GILCU and DAF Programs. These data are shown below:

	N	CT #1 SW/M	CT #2 SW/M	Session Hours	Program Talk Time	Per-Cent	SW/M	WS/M
GILCU 1972	4	5.9	.3	9.6	5.6	58	.7	109.8
GILCU 1973	9	6.0	.5	7.8	3.7	47	.6	138.8
DAF 1972	4	6.8	.1	6.0	2.9	48	.1	30.3
DAF 1973	11	7.5	.3	8.0	3.5	44	.4	70.2

Overall it may be observed that the Year 2 subjects were more severe, and demonstrated more stuttering throughout the programs. The GILCU Program ran faster, but with less talk time percent in Year 2, whereas DAF ran slower with less talk time percent in Year 2. Of most significance is the increase in WS/M

during the Year 2 DAF Program. This change reflects the change in training during Year 2. One observation during Year 1 of the DAF Program was that the subjects were patterned too slowly, hence they had problems in transfer. The change in training the clinicians to pattern the subjects at higher rates was effective.

Back-up Reinforcers.

The same system generally was used in the second year of the project. The major change was to permit the clinicians to change back-up reinforcers, if they and the project supervisor believed that the basic ones (toys and school supplies) were either inappropriate to the age and sophistication of the subjects or if the subjects were demonstrating non-cooperation. Eleven of the 12 elementary children chose the basic back-up reinforcers while 10 of the 12 Junior/Senior High School students received different ones. These were food certificates (for ice cream or hamburgers) for seven subjects and specific items, hair creme, magazines, etc., for the other four subjects.

Analysis of the Transfer Program

There were 20 subjects who completed the Establishment Programs and went into the Transfer Program. One DAF subject (T. G.) dropped from the project after completing two steps. Of the 10 remaining DAF subjects, five successfully completed the program and passed CT #3, four completed the program, but could not pass CT #3 and one did not complete the program. Of the nine GILCU subjects, six successfully completed the program and passed CT #3 and three did not complete the Transfer Program. There was no branching necessary, but three subjects (all DAF) did have to recycle. The results of the Transfer Program are shown in Table 20.

Subjects Who Completed the Transfer Program and Passed CT #3. There were six GILCU subjects and five DAF subjects who completed the Transfer Program and passed CT #3. Two of the DAF subjects had to recycle, S. R. because her Transfer Program was unusually extended (199 days) and D. S. because he changed schools and demonstrated failure in the conversation mode on CT #3 (.7 SW/M). Both recycles required four sessions each.

A Kruskal-Wallis one-way analysis of variance for the two groups on CT #1, #2 and #3 yielded the following results:

	H	p	Level of Significance
CT #1	8.5	.01	.05
CT #2	3.4	.10	.05
CT #3	.2	.70	.05

Table 20

N, Means and Standard Deviations of: Stuttered Words Per Minute (SW/M) in the Stuttering Interview (SI), Criterion Test (CT), Natural Speech Samples (NSS) and Transfer Program; Words Spoken Per Minute (WS/M) in the Transfer Program; and Total Session Hours, Talk Hours and Calendar Days for 18 Subjects: 11 GILCU and DAF Subjects Who Completed the Transfer Program and Passed Criterion Test #3, 4 DAF Subjects Who Completed the Transfer Program and Failed Criterion Test #3, and 3 GILCU Subjects Who Did Not Complete the Transfer Program.

Program	N	CT#1 SW/M	CT#3 SW/M	SI#2 SW/M	SI#3 SW/M	NSS#2 Home SW/M	NSS#3 Home SW/M	NSS#2 School SW/M	NSS#3 School SW/M	Session Hours	Talk Hours	Percent Talk Time	Program SW/M	Program WS/M	Calendar Days
GILCU	6														
Mean		4.7	.3	.5	.4	.9	.7	1.0	1.0	8.0	2.6	32.5	.2	158.5	80.3
S.D.		1.3	.1	.2	.3	.5	.7	.6	1.0	2.3	.5	7.6	.1	42.2	36.0
DAF	5														
Mean		10.0	.4	6.8	.5	3.9	1.2	3.2	1.3	9.8	3.0	30.6	.2	120.8	115.2
S.D.		3.4	.2	3.4	.2	3.6	.7	3.5	1.1	2.1	.8	4.1	.1	29.6	57.0
DAF Complete Transfer Fail CT	4														
Mean		6.5	1.7	4.2	2.4	4.5	2.0	6.7	2.2	10.1	3.0	29.7	.2	120.4	117.3
S.D.		3.1	.9	3.6	1.3	5.0	1.4	7.8	2.5	4.6	.9	6.5	.1	29.7	43.5
GILCU Did Not Complete Transfer	3*														
Mean		8.6	1.7	3.5	1.6	2.7	2.0	3.7	1.8	6.8	2.3	33.8	.4	144.3	125.3
S.D.		8.8	1.6	3.4	2.4	.9	.5	4.6	.6	2.5	1.2	11.3	.2	18.3	23.2

* 1 DAF Subject Also Did Not Complete Transfer.

There was a significant difference between the two groups on CT #1, but no significant differences between the two groups on CT's #2 and #3. The DAF group had a significantly higher stuttering rate than the GILCU group on CT #1.

The GILCU subjects who were successful in the Transfer Program were the subjects with milder stuttering behavior (lower SW/M rates). The extra program measures (SI #3 and NSS #3) indicated additional reductions in stuttering rate from those (SI #2 and NSS #2) taken at the end of the Establishment Program.

Overall the Transfer Program ran well. The operational characteristics of the 23-step Transfer Program were 8.0 therapy hours (16 sessions) for GILCU subjects and 9.8 therapy hours (19 sessions) for DAF subjects at a rate of .2 SW/M.

Assuming 8.0 therapy hours or 16 sessions run at 2 sessions a week, the Transfer Program should have been completed in eight weeks. However, the average Transfer Program ran 11 weeks (this figure is arrived at by averaging the number of weeks taken to complete the Transfer Program by the subjects who did not recycle) hence, three additional weeks were absorbed in absences or organizational activities. The Transfer Program required a certain amount of extra program organization which many clinicians found difficult to do. This tended to extend the Transfer Program (three weeks for GILCU subjects and six weeks for DAF subjects).

The percent talk time decreased due to time spent in setting up the Transfer situation, e.g., waiting for 4 minutes of subject talk time in the classroom setting. The SW/M in the Transfer Program were similar for subjects from both the DAF and GILCU programs. The WS/M indicated differences between the DAF and GILCU groups. While the DAF group demonstrated an increase in rate toward normal (120.8) that rate was still lower than that of the GILCU group (158.0). However, the final CT #3 WS/M rates were very similar (DAF 133.1 versus GILCU 138.9). The Transfer Program was both necessary for this population (as indicated by NSS #2 performance) and effective (as indicated by NSS #3 performance). The subjects generally operated well (.2 SW/M) which attested to the effect of the Establishment Program and the appropriateness of the Transfer Program steps which provided a high degree of success (low SW/M rate).

Subjects Who Completed the Transfer Program and Failed CT #3. There were four subjects, all from the DAF Program, who, although they completed the Transfer Program, could not pass CT #3. All extra program measures such as the SI and NSS indicated reductions in stuttering behavior, but not to the extent demonstrated by those who passed CT #3. The intra Transfer Program performance of these subjects appeared comparable to those who passed, in fact they ranged from .5 to .3 SW/M. Each of the subjects presented a different situation. Subject X.C. had been recycled four times in the Establishment Program. He did not use pattern in any Transfer Program performance as

measured by his word rate throughout the Transfer Program (151, 154, and 154 WS/M in three different samples across the Transfer Program). Subject K. D. had been recycled twice during Transfer and missed passing CT #3 by only one stuttered word in monologue. However, her word rate and use of pattern were abnormal in that she never achieved a normal rate and rhythm due to the effect of incorrect pattern training as evidenced by her continued low word rate (87.3 WS/M) on CT #3.

The Transfer Program performance of Subjects T. D. and M. P. indicted very low rates in Transfer steps (.3 and .05 SW/M, respectively) and relatively high rates in CT #3 (2.3 and 2.3 SW/M, respectively). In these situations, the counting accuracy of the clinician was questioned. Analysis of the last two transfer steps for each subject indicated that the clinicians had not counted stuttered words (undercounts of 4,5,7 and 7) during these steps, hence they permitted these two subjects to pass steps when in actuality they had not been fluent enough (0 SW/M). Also the Transfer Programs of Subjects T. D. and M. P. had been extended over 20 and 15 weeks, respectively, when normally they should have been completed in ten and seven weeks. The extension of the Transfer Program was detrimental to its success.

Subjects Who Did Not Complete the Transfer Program. There were four subjects (V. C., C. B., and S. W. from GILCU and K. T. from DAF) who did not complete the Transfer Program. An analysis of their performance is as follows:

Subject	CT #1 SW/M	CT #3 SW/M	Number Sessions	Number Steps Passed	Session SW/M	Talk Percent	Calendar Weeks
V. C.	3.2	.6	20	9	.4	23	21.7
C. B.	18.7	3.6	15	12	.6	46	16.2
S. W.	3.9	.9	11	14	.1	33	15.7
K. T.	3.2	.9	10	18	.1	34	4.1

Subject V. C. was passing steps but moving through the program very slowly, mainly because she was not very talkative and had attendance problems. Subject C. B., one of the most severe stutterers in the group, was moving very slowly through the program and had attendance problems. Subject S. W. was moving well through the program, but had attendance problems. The Transfer Program had been over extended (more than 11 weeks) for all three of the former subjects. Subject K. T. was doing well in the Transfer Program, but there was not time for him to complete the program. All four of the subjects did not pass CT #3, although their rates were less than at CT #1.

Parent-Teacher Transfer Sheet. At the end of the Home Series, C., in the

Transfer Program, the parents were asked to make ten positive comments to the subject about his speech each day for 15 days. The parent was to record a mark for each comment and make a comment about the procedure. The teacher was to do the same at the end of the Classroom Series, D. There were 16 subjects who had completed the home and school series. The results of the analysis of the Parent-Teacher Transfer Sheets are shown below:

Person	Number	Percent	Number with 10 Marks	Average Number Marks	Number with 15 Days	Average Number Days	Number Of Comments
Parent	12	75	5	6.5	8	13.3	2
Teacher	8	50	1	5.3	4	10.8	3

Only 20 of 32 (62 percent) possible forms were available for analysis. It is not known whether the clinicians did not give out or return the forms, or if the parents and teachers did not complete and return them. This made analysis difficult. Of the forms received it can be seen that five of the parents collected ten marks a day and eight of the parents continued marking for the full 15-day period. Of the teachers, only one collected ten marks a day and only four continued the marking process for 15 days. Theoretically, this procedure should be helpful to subjects to maintain their fluent speech in the home and school settings but the results above suggest that the procedure is not very functional. Relatively few parents and teachers completed the entire sequence and their comments were few, some positive and some negative. Assuming that the procedure is worthwhile, more time and effort must be spent by the clinician to aid the parent or teacher in carrying it out correctly. There did not appear to be any relationship between successful Transfer Programs and the Parent-Teacher Transfer Sheet activities.

Analysis of the Maintenance Program

The 11 subjects who finished the Transfer Program went into the Maintenance Program. The results of their performance are shown in Table 21. Seven of the subjects had been in the Maintenance Program long enough to warrant additional NSS, hence NSS #4 for Home and School was collected. These samples generally corroborated the subjects' performance in the Maintenance Program steps except that they indicated higher rates. The Maintenance Program was running reasonably well with the subjects continuing to demonstrate fluent speech during these sessions as well as in the NSS. Three of the 11 subjects had successfully completed the 4-step, three-month Maintenance Program.

Analysis of Clinicians' Performance

The clinicians varied greatly in age and experience. The clinicians

Table 21

N, Means and Standard Deviations of: Stuttered Words Per Minute (SW/M) in the Natural Speech Samples (NSS) and Maintenance Program; Words Spoken Per Minute (WS/M) in the Maintenance Program; and Total Session Hours, Talk Hours, and Calendar Months for 11 GILCU and DAF Subjects.

Program	N	NSS #4 Home SW/M	NSS #4 School SW/M	N	Session Hours	Talk Time	Percent Talk Time	Program SW/M	Calendar Months
GILCU	3			6					
Mean		.5	.8		1.0	.5	50.0	.3	1.8
S.D.		.3	.3		.4	.1	5.9	.2	1.3
DAF	4			5					
Mean		.7	1.0		1.2	.6	50.0	.3	1.6
S.D.		.9	.6		.7	.3	10.3	.2	.7
Total	7*			11					
Mean		.6	.9		1.1	.6	50.0	.3	1.7
S.D.		.7	.5		.5	.3	8.2	.2	1.0

* 4 Subjects had not been in maintenance long enough to make an NSS #4 meaningful.

from Site 1 had previous experience with programmed instruction. Their performance was evaluated in several different ways. They were tested at the end of the initial training workshop, they were observed several times during the year and rated on their performance and they were rated on the performance of the subjects with whom they worked.

Initial Training Workshop.

The clinicians were trained and tested on two aspects of the programs: counting stuttered words and verbal knowledge of the program operation. They also engaged in a practicum with the project director and supervisor acting as subjects, but this was not scored. The results in percentage correct out of a possible 100 of the counting stuttered word training (CSW) and the written test are shown below: (Also shown are Subject Performance and Monitoring Scores which will be discussed later).

Clinician	CSW	Written Test	Monitoring Score	Subject Performance
1	80	85.7	12	86.3
2	60	95.0	49	91.5
3	80	93.0	33	86.7
4	70	95.7	20	87.2
5	90	94.7	48	85.3
6	60	86.7	66	89.2
7	70	96.0	100	96.9
8	80	98.0	38	85.4
9	--*	82.1	43	85.5
10	--*	80.7	47	90.7
11	90	99.0	97	90.3
12	60	100.0	66	79.6
M	79.0	92.2	51.6	87.9
S.D.	11.7	6.7	27.0	4.3

* Data Lost

The clinicians scored a mean of 92.2 percent on the written examination and a mean of 79.0 percent on counting stuttered word task. Each set of the ten scores available was ranked and a Spearman-Rho correlation computation yielded a correlation of .04. There was no correlation between their verbal knowledge of the program and their ability to count stuttered words.

Previous experience with training people in counting stuttered words indicated that a score of 70 was adequate. Seven of the ten clinicians

scored this well. Eight of the 12 clinicians scored above 90 percent on the written test. This performance compared favorably to other groups in the past who had received similar training. The clinicians were extremely cooperative and worked hard during the workshop. They performed well during the practicum with only two exceptions. These two clinicians later required additional training.

Monitoring.

The clinicians were monitored both live and by tape recording several times during the year. There were 126 total observations (34 tape and 92 live or 73 percent live) for an average of five per clinician. Effort was made to see each clinician with each of her two subjects at least once every three weeks or a month. Later in the project the number of observations was gradually decreased. Due to subject absences many of the scheduled observations did not result in an observation. After each observation (live or tape-recorded) the project supervisor filled out a Session Monitoring Form (see Appendix), scored it and/or reported the pertinent results to the clinician. There were five areas of program operation scored: A. Counting Stuttered Words which was scored both as to total number of stuttered words counted (CSW 1) and specific stuttered words counted (CSW 2). This yielded two different percent of agreement scores between the project supervisor and the clinician. The first score for counting stuttered words was derived by determining the total counted by the clinician and the total counted by the supervisor, dividing the smaller number by the larger and multiplying by 100 to yield a percentage. If the counts were under ten and within one of each other, e.g., clinician counted one and the supervisor counted two, this was computed as 90 percent agreement rather than the true arithmetic 50 percent. This correction was done to more accurately reflect the accuracy of the clinician. The second score (percentage of agreement) was derived by taking the number of stuttered words that the clinician counted which the supervisor also counted and dividing that number by the total number counted by both. Example: Clinician counted seven stuttered words, and supervisor counted ten. On five of the stuttered words the supervisor agreed with the clinician that they should be counted. Hence, the calculation was $5/2 + 5 + 5$ or $5/12 \times 100 = 42$ percent. This consistently yielded a percent lower than the percent for the total count which in this case would have been $7/10 \times 100 = 70$ percent.

The second area B. was timing. The score for this was derived by adding up the total seconds timed by the clinician and those by the supervisor and dividing the smaller by the larger. Example: 1076 seconds of talk time timed by the clinician was divided by 1079 seconds of talk time timed by the supervisor $\times 100 = 99.5$ percent.

The third area C. was Program Administration. A percentage of accuracy was derived by counting up the total number of correct responses by the clinician and dividing it by the number of responses X 100 which yielded a percent. Example: 15 correct / 17 total X 100 = 88 percent. This was done for only the stimulus presentation and consequence activity.

Area D. Efficiency. This was measured by the score of talk time divided by session time X 100. Hence, 10.25 minutes of talk time/30 minutes of session time X 100 = 34.2 percent. Previous experience had suggested that a talk time ratio of 50 percent was possible and desireable.

Area E. Data. The percentage score in this area was found by adding the number of "yeses" (4 possible) and dividing by the total 4; thus 3 "yeses"/ 4 total X 100 = 75 percent.

The above procedures were followed to determine the total group's performance for purposes of summarizing the monitoring performance. To determine an individual clinician's performance, three changes were made. The first was to collapse the Area C. Program Administration into one score. The second was to double the talk time efficiency (Area D.), hence 40 percent talk time was doubled to give a score of 80 percent accuracy, but with a limit of 100 percent. The third was to subtract 5 percentage points from 100 for each error mark in the E. Data section. This was done to avoid over penalizing the clinician for errors in Data Analysis. Hence one error mark would equal 95 percent rather than 75 percent.

In order to analyze the clinicians' performance, 92 of the 125 observations were selected for analysis. All clinicians were in the Establishment Program. These 92 were selected to present an equal representation of clinicians over time. Due to absences, changes in schedules, etc., it was not always possible to see every clinician during every site visit. Out of the 92 monitorings, 71 were live and 21 were from tape recordings (77 percent live). Sixty-one (30 GILCU and 31 DAF) were selected for a sub-analysis. The results of these analyses are shown in Table 22.

By-site Analysis. For the first three observation periods (Sessions 4, 8, 15) the data are separated out into the three sites. After these observations the number of total observations decreased to the point to make site comparisons non-meaningful. The clinicians in the three different sites performed differently during session 4 which was their first therapy session (the first three having been devoted to CT). The average performance accuracy was 74 percent with site #3 at 59 percent and site #1 at 77 percent. All three sites demonstrated relatively low scores in counting stuttered words and talk time efficiency. After the monitoring took place and they received feedback on their performance their scores improved in the session 8 visit. The sites were more similar in performance (85, 85 and 82 total mean percent of accuracy). Their lowest area was still in counting stuttered words. After receiving feedback, their performance in Session 15 again showed similarity to Session 8 with a slight drop in counting stuttered words accuracy.

For sessions 20, 30 and 40 their percent of accuracy remained fairly stable, ranging from 75-84 percent accuracy. The clinicians' total performance indicated an average accuracy of 78 percent. Counting stuttered words, talk time efficiency and data analysis were the areas of most difficulty.

Table 22

Analysis of the Monitoring Data on Clinician Performance for Six Different Program Activities Expressed in Percent of Accurate Responses.

Session	Site	N	Count SW-1 Mean	Count SW-2 Mean	Timing Mean	Stimulus Mean	Consequence Mean	Talk Time Ratio Mean	Data Calculation Mean	Total Mean
4	1	8	75	66	97	96	88	36	78	77
	2	7	51	57	94	100	87	33	71	70
	3	8	62	46	89	73	67	32	51	59
All		23	65	59	93	93	81	34	67	74
8	1	8	90	87	96	100	100	40	84	85
	2	6	90	76	97	100	96	51	88	85
	3	7	82	76	99	93	96	47	83	82
All		27	87	80	97	98	97	45	85	84
15	1	5	85	79	92	100	100	36	80	82
	2	6	68	66	97	100	83	51	83	78
	3	7	90	85	98	98	92	37	54	79
All		18	79	77	96	99	91	41	72	79
20 All		10	71	61	90	86	97	41	80	75
30 All		12	79	71	86	100	95	33	65	76
40 All		8	81	71	93	91	88	35	74	84
Total		92	78	70	93	95	92	38	74	78
GILCU		30	80	75	92	100	96	39	71	79
DAF		31	74	68	95	94	83	41	82	77

A comparison between the GILCU clinicians and the DAF clinicians indicated few major differences between the two groups. The GILCU clinicians were more accurate in counting stuttered words and providing stimulus, whereas the DAF clinicians were more accurate in data calculation. The groups were comparable in the other variables. It is difficult to make a value judgement of these scores except to note the inter-site differences, the inter-variable differences, and the variance from 100 percent accuracy.

Comparison of Live vs Tape-Recorded Monitoring. Most sessions were not monitored. The clinicians ran the programs without supervision (an average of 50 sessions with an average of 5 monitored live) most of the time. In order to determine whether or not the clinicians performed differently during a live monitoring from a non-monitored session, two sessions of six different clinicians (three on DAF and three on GILCU) were randomly selected for detailed analysis and comparison. These samples were from sessions 11-17. Six live monitored sessions were selected and then six tape-recorded sessions immediately preceding each of the live monitored sessions were selected and a monitoring analysis done of them. The results of tape vs live monitorings for five variables is shown below:

	Tape		Live			
Variable	Mean	S.D.	Mean	S.D.	Difference	t
Count SW 1	47.8	28.4	98.3	4.1	50.5	3.94*
Timing	89.6	11.8	94.8	4.8	5.2	.91
Stimulus	74.1	31.9	91.7	13.6	17.6	1.14
Consequence	77.3	35.5	100.0	0.0	22.7	1.43
Talk/Time	37.1	14.2	48.6	9.5	11.5	1.51
Total	61.8	30.3	86.0	25.6	24.2	1.36

* Significant at .05

Although only one of these comparisons was statistically significantly different, these data suggest that the clinicians performed better when they were observed than when they were not observed which is consonant with the observations made the first year and with the findings of other researchers. (Skinrud, 1973). These data also suggest that the values shown in Table 22 are somewhat inflated by the high percentage (73 percent) of live monitoring. Whether or not this small sample accurately represents the amount of difference between observed and non-observed performance is not known. These data also suggest that the act of monitoring may serve to improve the performance of clinicians.

Reliability of Data. In addition to checking the clinicians' data recording

and computation during monitoring, the BSI staff also re-calculated much of the first data input because numerous errors were observed. To determine the reliability of clinician computed data with the BSI staff computed data, 19 samples of re-calculated data were randomly selected and analyzed. The results are shown below.

Variable	BSI Staff		Clinician		Difference		
	Mean	S.D.	Mean	S.D.	Mean	"t"	r
SW/M	.87	.56	.84	.53	.03	.17	.97
Time	12.70	5.01	13.18	4.30	.48	.31	.99

These data indicated that the computational errors made by the clinicians were minimal and did not affect the data. After this analysis BSI staff no longer re-calculated the clinicians' data. The clinicians did demonstrate inconsistent calculation errors, but these were not of great magnitude. The clinicians could accurately record and compute the data.

Monitoring Scores and Subject Performance Scores. Two other scores for monitoring and subject performance have been shown previously. The monitoring scores were derived from an analysis of clinicians' performance in the two Establishment Programs. Their scores from Sessions 8 and 15 for their two subjects were averaged to yield a monitoring score. The computation of these scores has been explained previously.

The subject performance score was derived from the following formula:

$$\frac{\text{SW in SI \#1 X Phase Completed (ETM *)}}{\text{Session Hours in Establishment, Transfer and Maintenance}} \times 8 = \text{SPS}$$

*E=1, EF = 2, EP = 3, T = 4, TF = 6, TP = 8, M = 10

P=CT Passed, F=CT Failed

This formula yielded a rather small number which was then mulitplied by 8 to make it comparable to the monitoring score. The formula does not allow for attendance problems which resulted in the low score for clinician 1. This score tends to under-rate the clinician who runs well with low-rate subjects such as clinician 8. This score tends to over-rate clinicians who run moderately well with high-rate subjects (clinicians 9 and 12). Despite these limitations this scoring system represents an effort to quantify successful program operation

by measuring the end product and the time taken to achieve it. With further refinement it might be helpful in the evaluation of clinician performance.

These scores are somewhat difficult to evaluate because there is nothing against which they can be compared. They represent an initial effort to quantify clinician success (also indirectly program and training effectiveness). The performance of clinicians 7 and 11 suggests an achievable standard against which future data may be compared.

The monitoring scores and subject performance scores were ranked and correlated yielding a Spearman-Rho correlation of .58 which is significant at the .05 level.

A similar procedure was done for the total workshop score (CSW and Written Test Score) and the Program Performance (Monitoring Score and Child Performance Score) which yielded a Spearman-Rho correlation of .58 also.

There were significant, but small, correlations among the various scores. It appears that the extremes are predictive, low scores in workshops predict low performance in the program and high scores predict good performance in the program, the middle performances are not predictive. A most important variable which is hard to measure and control is the clinicians' ability to "adhere to the program" when they are not being monitored.

Clinician Self-Rank and Supervisor Rank. At the end of the project the clinicians were asked to rank themselves from 1-5 on the various skills involved in the program. Their self-rankings were averaged and further ranked from 1-12. The supervisor was asked to rank the clinicians from 1-12 on their Establishment Program performance. These rankings were correlated yielding a Spearman-Rho correlation of .40 which was not significant at the .05 level.

Counting Stuttered Words. It was noted in Year 1 that the clinicians had the most difficulty with counting stuttered words during program operation. They consistently under counted. It was hypothesized that by improving the training and providing continual feedback to the clinicians about their counting accuracy (through the monitoring site visits) that this would solve the problem in Year 2. As discussed earlier, undercounting stuttered words appeared to be responsible for many program recycles and CT failures. Feedback of accuracy of stuttered word counting did improve counting accuracy (See Table 22, especially the difference between sessions 4 and 8). However, casual observation by the program supervisor revealed an interesting phenomenon which came to be labelled the "Can but won't" syndrome. Many times clinicians would indicate their recognition of a stuttered word, but would not say "stop". They tended to count better on CT's during which they did not have to say "stop". They verbalized that they knew the subject had stuttered, but they did not want to stop the subject. During relistening of a tape recording of a session with the project supervisor the clinician would accurately count all the stuttered words. This problem appeared to be related to the clinicians' previous experience or knowledge of stuttering. They found it difficult to

deliver what was in their minds, a punishing, "stop." Another explanation is that they wanted the subject to pass the step, hence would let a stuttered word go by, not realizing that the subject would not pass the CT because he had not passed the program step. Failure on the CT appeared to be the solution for several clinicians. This made them realize that they had to count better during the program. However, the data are not clear on this point, because the subjects' stuttering rate also decreased so that failure on the CT might have also prompted the subjects to "do better." The programs are designed to operate with minimal recycling and they do with experienced clinicians (Ryan and Van Kirk, 1974). Unfortunately, the clinicians who were running the program for the first time, tended to improve their counting accuracy only after a subject failed on a CT. Some way must be found to improve the clinicians' counting accuracy to prevent recycles and CT failures.

Summary.

The 12 clinicians who volunteered for this project appeared to be a reasonable cross-section of public school speech clinicians as measured by age and years of experience. Six of the 12 had had previous experience with programmed therapy. The 12 clinicians gave very good cooperation and in many instances went far beyond their basic duties to collect data and carry out project procedures. The objective measures suggested their ability to learn the programs and to carry them out properly at 87 percent accuracy. Their one major problem, accuracy of stuttered word count, appeared to be more of an attitude problem than a functional problem. Programmed instruction requires a certain "faith" in the program, an adherence to the protocol and a good deal of work and attention. These factors tend to be produced by adequate training, strict supervision and/or successful performance of the child. By the end of the project casual observation suggested that all 12 of the clinicians were capable of running the programs well, although some were still undercounting stuttered words.

Stuttering Interview (SI)

The Total Group.

The SI may be viewed as an extra-program measure of stuttering behavior. It has a cross-section of speaking acitivities, was administered by a person other than the clinician and was video-taped with the camera and technician in the room. The SI yielded a 10-minute sample of speech within a 15-minute test period. The results of SI #1, #2 and #3 for all the subjects are shown in Table 23.

It can be seen in Table 23 that the two groups (GILCU and DAF) were similar in their performance on SI #1 on all variables measured; SW/M, WS/M and percent of stuttering. This similarity persisted into SI #2 and #3. The greatest reduction in stuttering behavior was shown in SI #3. This was due to several factors. The DAF group did not show pattern in SI #2. Their word rate in SI #2 supports this observation. The GILCU subjects performed better on

Table 23

N, Means and Standard Deviations of SW/M, WS/M and Percent for Stuttering Interviews (SI) #1, #2 and #3 for the Two Program Groups: GILCU and DAF.

Program	SI #1				SI #2				SI #3			
	N	SW/M	WS/M	Percent	N	SW/M	WS/M	Percent	N	SW/M	WS/M	Percent
GILCU	12				11				9			
Mean		8.3	107.8	7.7		4.1	118.9	3.3		.9	132.4	.7
S.D.		6.0	20.3	7.4		7.1	47.7	6.3		1.4	27.3	1.0
DAF	12				12				10			
Mean		7.4	111.0	6.7		5.0	123.3	4.0		1.1	136.1	.8
S.D.		5.0	10.0	3.0		4.5	21.3	3.7		1.2	16.2	.7
Total												
Sum	24				23				19			
Mean		8.0	109.4	8.0		4.2	119.9	4.0		1.0	134.7	.7
S.D.		5.1	16.1	6.0		6.1	34.1	5.0		1.2	20.4	.8

SI #2 than did the DAF subjects (See Table 19) indicating more generalization effect for GILCU than for DAF subjects. SI #3 demonstrated best the overall impact of the fluency training on the entire group (N 19) who completed Establishment and were into Transfer and/or completed Transfer. Their SW/M rate was greatly decreased, their word rate was increased (well within normal limits) and the amount of stuttering was less than 1 percent.

Topographical Analysis.

The purposes of this analysis were to determine if there was a relationship between topography and rate, if there was a relationship between speaking activites and topography and if topography was predictive of improvement.

A topographical analysis of whole-word repetitions, part-word repetitions, prolongations and struggle was done on SI #1 for six subjects. These subjects were selected to represent mild (5.0 SW/M), moderate (12.0 SW/M) and severe (19.0 SW/M) stutterers, two for each group. A reliability probe for classification was 97.3 percent agreement. Each stuttered word was classified only once, hence if a part-word repetition was said with struggle, it was classified as struggle. The results are shown in Table 24.

There was a relationship between topography and rate. The lower rate subjects demonstrated the most whole-word repetitions, the moderate group demonstrated the most part-word repetitions and the severe group demonstrated the most struggle behavior. There was a very low rate of prolongations for all groups. Struggle behavior was evidenced in all groups.

To determine if there was a relationship between speaking activity and the general topography, the speaking activity which most accurately resembled the total topography was selected for each subject. The finding was that either monologue or conversation most accurately reflected the topography shown in the entire SI. The matching was best in the moderate and severe groups. They demonstrated a consistency of performance across speaking activities, whereas the mild group was more variant. Topographical analysis is extremely tedious and time consuming, hence any sampling procedure which would reduce this process would be helpful. These data suggest that for moderate and severe stutterers relatively representative samples would be monologue or conversation, whereas for mild subjects it would be necessary to analyze the entire corpus of the SI.

The two mild subjects (D. M. and B. A.) and one of the two moderate subjects (D. S.) completed the programs through maintenance. The other moderate subject (T. D.) completed Transfer and failed CT #3. Of the two severe subjects, subject C. B. was in Transfer and subject D. M. made no improvement. A topographical analysis did not differentiate between success and failure in the program, hence has little or no predictive value for success in the program. Overall stuttering rate is more predictive. The mild subjects did better than the moderate and the severe subjects.

Table 24

Topographical Analysis Expressed in Percent for 6 Subjects on the Stuttering Interview (SI #1).

Type of Stuttering	Severity, Subjects and Modes of Highest Agreement With Total												
	Mild 5.0 SW/M				Moderate 12.0 SW/M				Severe 19.0 SW/M				
	Subject M.O		Subject B.A.		Subject T.D.		Subject D.S.		Subject D.M.		Subject C.B.		
	Total	Con	Total	Mon	Total	Con	Total	Mon	Total	Con	Total	Con/Mon	Total Mean
Whole Word Repetitions	28	45	43	33	38	47	16	14	12	13	0	0	22.8
Part-Word Repetitions	22	9	51	56	43	39	64	71	0	0	0	0	30.0
Prolongations	12	28	2	0	0	0	0	0	4	7	1	0	3.2
Struggle	38	18	4	11	19	14	0	15	84	80	99	100	44.0
Total	100	100	100	100	100	100	100	100	100	100	100	100	100.0

Item Analysis.

An item analysis of the ten different speaking activities on the SI was done for SI#1 and SI#2. The purposes of this analysis were to determine a ranking of the items and to examine SI#2 for predictive value of transfer effects. The items were scored as to SW/M, WS/M and percent of stuttering. The items were then ranked from lowest stuttering rate or percent (1) to highest (10). A special procedure was used for items 1-3 because they generally were completed in less than 30 seconds yielding a very small time sample. The number of subjects who stuttered on these items and their average number of stuttered words on the items were more representative of their performance than SW/M and percent. The results of this analysis are shown in Table 25. The first three items; Automatic, Echoic and Pictures, were pre-judged to be the least stuttering evoking. There was a slight shift in their rank order from SI#1 to SI#2. Naming pictures evoked the least stuttering and echoic evoked the most on both SI#1 and #2.

For the remaining seven items on SI#1, Speaking Alone evoked the least amount of stuttering whereas Monologue and Conversation evoked the most. On SI#2 the rankings shifted. Reading evoked the least amount of stuttering. Telephone and Observation of Talking with a Stranger in Another Setting evoked the most. This shift reflected the program activities which concentrated on reading, monologue and conversation. The actual means of SW/M difference are not very great (less than 1 SW/M in most comparisons). The shifting to Telephone and Observation of higher rates on SI#2 was due to the fact that training in these activities occurred in the Transfer Program which came after SI#2.

In order to select a mode which might accurately reflect the total SI#1 performance, correlations were run between the total SI#1 SW/M rate and Speak Alone, Monologue and Conversation. The results are shown below.

	Speak Alone	Monologue	Conversation
Total SI#1 SW/M	.70*	.87*	.80*

* Significant at .01

Monologue showed the highest correlation of the three with the total SW/M of the SI#1. This information was used to aid in the selection of video-taped samples of monologue to preserve as a record of the project. This analysis also suggested that a one-minute sample of monologue might serve as an accurate screening procedure.

Table 25

Analysis of 10 Items on Stuttering Interviews (SI #1, N 24; SI#2, N 23) in Number of Subjects Who Stuttered, Number of Stuttered Words Per Subject, Means and Standard Deviations for Stuttered Words Per Minute (SW/M, Words Spoken Per Minute (WS/M), and Percent and Ranking from 1 (Least Stuttering) to 10 (Most Stuttering).

Item	SI #1						Rank		SI #2						Rank	
	No. of Subjects	No. of SW per Subject					SW/M	Percent	No. of Subjects	No. of SW per Subject					SW/M	Percent
1. Automatic	17	2.5							6	1.7						
2. Echoic	16	3.3							11	1.5						
3. Pictures	6	2.3							2	3.5						
	SW/M Mean	S.D.	WS/M Mean	S.D.	Percent Mean	S.D.			SW/M Mean	S.D.	WS/M Mean	S.D.	Percent Mean	S.D.		
4. Reading	8.0	9.0	127.0	41.1	6.3	2.2	7	4	2.2	3.5	142.7	49.5	3.1	6.6	4	5
5. Speak Alone	7.0	6.0	103.3	18.1	6.8	3.3	4	5	3.3	6.3	119.1	24.3	3.0	6.0	5	4
6. Monologue	10.0	8.0	97.5	19.8	10.3	4.1	9.5	10	4.2	7.3	118.2	30.0	3.8	6.5	6	7
7. Questions	9.4	8.1	120.0	33.5	7.8	6.8	8	7	5.0	9.0	145.9	36.1	3.7	6.3	8	6
8. Conversation	10.0	7.1	108.0	23.4	9.3	3.0	9.5	9	4.7	5.8	120.1	30.3	4.6	5.7	7	9
9. Telephone	8.0	4.1	98.8	35.5	8.1	1.2	6	8	6.7	7.9	112.8	26.1	9.0	12.2	10	10
10. Observation	7.2	4.0	100.3	25.0	7.2	1.6	5	6	6.0	7.8	119.0	31.1	4.3	5.6	9	8

Transfer Analysis.

To determine if there was any value of SI#2 in prediction of transfer effects, a series of correlations were run on the total SI#2 SW/M performance; the SI#2 items of Conversation, Telephone and Observation; and the transfer activities of SW/M and Talk Time in the Transfer Program; and the NSS#2. The results are shown below:

	Conv. SW/M	Tel. SW/M	Obs. SW/M	Transfer SW/M	Transfer Talk Time	NSS#2 Home SW/M	NSS#2 School SW/M
SI#2	.98*	.89*	.96*	-.07	.11	.82*	.86*
Conv.		.89*	.94*	-.03	.28	.78*	.81*
Tel			.91*	.14	.08	.73*	.81*
Obs				-.04	.17	.75*	.77*

* Significant at .01

These data suggest that the Total SI#2 and Conversation correlate the highest (.98). The total performance on SI#2 best predicted performance in the NSS of all the items. The total SI and the Conversation item are the longest time sample (10 minutes and 3 minutes, respectively) of the four measures. It may be concluded that longer samples are more predictive. Even though subjects demonstrated higher SW/M on Telephone and Observation, these two items were not as predictive as the total SI and Conversation. None of the items were predictive of Transfer Program performance. The total SI performance has limited predictive power (can explain only 75 percent of the variance) of NSS performance. In addition, only 8 of 20 SI performances were below 1.0 SW/M. These low SI#2 rates were generated by subjects who were either elementary school level (4), or had demonstrated SI#1 rates which were low (4), or both (3). Considering the performance of subjects on NSS#2 from both the GILCU and DAF programs and the further reduction in NSS#3 after the Transfer Program, it appears that it is more defensible to continue to operate the Transfer Program than to try to develop a Transfer Program Test which would permit subjects to by-pass the Transfer Program.

Criterion Tests (CT)

The Total Group.

The CT is an intra-program test which directly measures the effects of the programs. The results for all subjects for CT #1, #2 and #3 are shown

in Table 26. The GILCU and DAF groups were comparable on CT#1 and CT#3 in all three dimensions of SW/M, WS/M and percent stuttering. They show differences in CT#2 on all three measures. This was due to two factors. The first was that the GILCU group data included the subject (D.M.) whose high rate of stuttering was unaffected by the program. The second was that many subjects in the DAF group demonstrated pattern during CT #2 as indicated by the lower 81.4 WS/M. However, the speaking rate of the DAF subjects approximated that of the GILCU group in CT#3. The most reasonable demonstration of the effects of the therapy programs was the performance of the subjects on CT#3. To further demonstrate the effects of the program, a topographical analysis of the stuttering behavior of the 11 subjects who completed and passed CT#3 revealed that although none of them demonstrated 0 SW/M, the stuttering which did occur was composed only of whole-word repetitions (.15 per minute) and part-word repetitions (.2 per minute). There were no instances of prolongation or struggle. These low rates of stuttered words and normal speaking rates demonstrated by this group suggest that their speech was well within normal limits on CT#3.

Reliability.

Reliability of counting stuttered words was computed in several different ways. The basic computation was to collect the number of stuttered words counted by the clinician and the number of stuttered words counted by the project supervisor and divide the larger number into the smaller, and multiply by 100 to determine percent of agreement: e.g. 5/10 X 100 = 50 percent. This process is tenable as a quick, easy and reasonably reliable way to determine counting accuracy. However, there were two other considerations. This method of computing percent agreement had limited accuracy when the counts of both observers were under 10. Only perfect agreement was accurate, 9/9 X 100 = 100 percent. A count of 8/9 yielded 88 percent, a count of 5/6 yielded 83 percent, a count of 2/3 yielded 66 percent and a count of 1/2 yielded 50 percent, although all of these counts were within one of each other suggesting a rather high accuracy of agreement. To correct for this statistical problem, it was decided to compute counts which were both under 10 and within one of each other arbitrarily as 90% agreement in order to more adequately represent the counting accuracy. A second consideration concerned the computation of individual percents of agreement per mode (reading, monologue and conversation) versus the total performance. Both methods were used, coupled with the under-10-within-1-equals-90-percent correction. Because the total counts tended to differ by more than one stuttered word more often than the individual mode counts, the percent correction rule was used more often in the individual mode averages. The results of using both methods for computation of percent agreement on stuttered words counted during CT#1, #2 and #3 are shown below.

Table 26

N, Means and Standard Deviations of SW/M, WS/M and Percent for Criterion Tests (CT) #1, #2, and #3 for the Two Program Groups: GILCU and DAF.

Program	CT #1				CT #2				CT #3			
	N	SW/M	WS/M	Percent	N	SW/M	WS/M	Percent	N	SW/M	WS/M	Percent
GILCU	12				11				9			
Mean		7.5	113.0	6.6		2.2	118.1	1.9		.8	130.8	.6
S.D.		5.7	28.7	6.3		5.0	25.6	4.9		1.1	30.1	1.0
DAF	12				12				10			
Mean		7.6	112.1	6.8		.5	81.4	.6		.9	121.2	.7
S.D.		3.9	20.1	3.3		.6	38.8	.5		.8	19.4	.8
Total	24				23				19			
Mean		7.5	112.6	6.7		1.3	98.9	1.3		.9	125.7	.7
S.D.		4.8	24.2	4.9		3.5	37.4	3.4		.9	24.8	.9

	CT#1 N 24	CT#2 N 23	CT#3 N 19	Total
Individual Mode Average				
Mean	79.1	79.0	67.9	75.3
S.D.	11.3	17.8	21.1	16.7
3-Mode Total				
Mean	84.8	59.7	53.8	66.1
S.D.	10.0	29.2	24.4	21.2

There was a consistent difference between the two methods over the three tests which reflected both the methodology and the decrease in stuttered words. The grouped total was higher in CT#1 and lower in CT#2 and #3. The individual mode average appeared to be more stable from test to test and had less variation. The clinicians become more variable in CT#2 and #3 and reduced in accuracy on CT#3. Their common error was undercounting.

Inter-CT Stability.

Before starting the program the clincians administered CT#1 three times (noted as 1, 1a and 1b), once in each of the first three sessions. In order to determine the stability of performance by the subjects on these three CTs, an analysis of the three tests was done. The results are shown below.

	CT#1 SW/M	CT#1a SW/M	CT#1b SW/M	CT#1/1a SW/M	CT#1/1b SW/M	CT 1a/1b SW/M
Mean	7.4	6.9	7.0			
S.D.	4.5	3.9	4.5			
r				.89*	.86*	.94*

*Significant at .01

This analysis revealed a high degree of consistency of performance by both subjects and clinicians across the three tests. The mean SW/M rate varied by less than 1 SW/M across the three tests and the correlations among the three are both significant and high. These data suggest that only one CT need need be administered because there was very little change across the three.

Intra-CT Stability.

In order to determine the stability of stuttering within a given CT over time, the CT#1 performance of six subjects (two mild, two moderate and two severe, the same six subjects used in the topographical analysis in the SI#1 discussed earlier) was re-analyzed from the tape recordings of CT#1. Both stuttered words and words spoken were re-counted and the sample re-timed. The percent of stuttering per one minute sample (cumulative) over the 4 minute samples in reading, monologue and conversation was computed. (A number of samples had been mistimed hence only the first 4 minutes were used.) The results are shown below.

Mode	Minutes (Cumulative) 1	2	3	4
Reading				
M.	9	9	9	9
S.D	6	5	5	5
Monologue				
M.	10	10	11	11
S.D	6	5	6	6
Conversation				
M.	12	12	12	11
S.D.	7	7	8	7

Although there was individual variation as evidenced by the standard deviations, these data suggest that the stuttering behavior was relatively stable over time. The behavior in reading was especially stable. The most variation occurred in monologue and conversation. These data suggest that samples ranging in length from 1-4 minutes will yield similar information about the stuttering rate behavior of a group of subjects under analysis, hence CTs may be shortened from 15 to 3 minutes without a great loss in their accuracy.

Reading, Monologue and Conversation.

An analysis of the 24 subjects on CT#1 in reading, monologue and conversation is shown below.

	Reading			Monologue			Conversation		
	SW/M	WS/M	%	SW/M	WS/M	%	SW/M	WS/M	%
GILCU Mean	6.0	119.0	5.0	8.0	107.3	7.5	9.1	114.0	8.0
S.D.	6.1	47.0	5.4	7.0	25.1	6.8	6.4	24.4	7.3
DAF Mean	7.2	115.1	6.2	7.0	104.1	6.7	9.1	117.1	7.8
S.D	4.5	36.3	2.9	4.1	17.1	3.8	5.3	22.1	4.6

These data suggest that the subjects demonstrated more stuttering in monologue and conversation than in reading. An analysis of individuals revealed that eight subjects demonstrated their highest rate in reading, three in monologue and 13 in conversation.

Comparison of SI and CT Performance.

The results of SI #1, #2, and #3 and CT #1, #2, and #3 are shown below for comparison purposes:

	#1 (N 24)		#2 (N 23)		#3 (N 19)	
	SW/M	WS/M	SW/M	WS/M	SW/M	WS/M
SI	8.0	109.4	4.2	119.9	1.0	134.7
CT	7.5	112.6	1.3	98.9	.9	125.7

The two tests indicated similar performances on #1 and #3 but show differences on #2 due to the presence of a severe stutterer in the GILCU sample on #2 and the use of pattern, hence slower rate, by the DAF subjects on #2. The correlations between SI #1 and CT #1 were .91 and between SI #2 and CT #2, .71 and between SI #3 and CT #3, .70. CT performance more closely resembled the performance of the subjects in the program whereas SI performance was generally higher in SW/M rate and resembled the NSS performance.

Natural Speech Samples (NSS)

The NSS in the home and school are viewed as measurements of generalization or transfer. During year 2 these samples were structured and there were only three of them for most subjects, although a fourth sample was taken for some subjects (See Table 21). The results of NSS #1, #2 and #3 are shown in Table 27.

The GILCU and DAF groups were comparable in NSS #1 and NSS #3 which is similar to the findings on the CT and SI. The two groups demonstrated

Table 27

N, Means and Standard Deviations of SW/M, WS/M and Percent for Natural Speech Samples 1, 2 and 3 in the Home (NSS-H) and School (NSS-S).

Program	NSS#1 SW/M	Home WS/M	Per-cent	NSS#1 SW/M	School WS/M	Per-cent	NSS#2 SW/M	Home WS/M	Per-cent	NSS#2 SW/M	School WS/M	Per-cent	NSS#3 SW/M	Home WS/M	Per-cent	NSS#3 SW/M	School WS/M	Per-cent
	N						N						N					
GILCU	12						11						8*					
Mean	7.8	106.0	7.3	8.3	108.3	7.7	2.9	116.9	2.4	4.1	118.3	3.5	1.1	131.0	.8	1.1	135.7	.8
S.D.	6.4	18.8	5.7	6.3	19.7	5.6	4.0	23.4	4.2	6.4	28.0	8.1	.9	31.3	.8	.9	27.9	.7
DAF	12						12						10					
Mean	7.0	103.6	6.8	7.5	116.2	6.5	4.4	122.4	3.5	4.7	127.5	3.7	1.6	125.7	1.2	1.7	123.6	1.4
S.D.	3.2	25.4	3.5	4.5	29.7	5.0	3.7	20.6	3.6	5.1	18.4	5.0	1.0	18.1	.6	1.7	21.4	1.4
Total	24						23						18*					
Mean	7.4	104.8	7.1	7.9	112.3	7.0	3.7	119.8	3.1	4.4	122.7	3.6	1.4	128.0	1.1	1.5	128.6	1.2
S.D.	4.9	21.9	4.6	5.4	25.1	5.2	3.8	21.6	3.8	5.6	22.6	6.6	1.0	24.2	.7	1.4	24.22	1.2

*No data for 1 subject

the most difference on NSS #2 with the GILCU group indicating more generalization of fluent speech. The DAF group also indicated a reduction in stuttering on NSS #2 but not to the extent of that of the GILCU group.

Overall the NSS data indicated a reduction in stuttering behavior throughout the year with the biggest change occuring between NSS #1 and NSS #2. However, the remaining subjects in NSS #3 continued to show a decrease in stuttering from NSS #2. Home and school samples indicated equal improvement with only slight differences between them throughout the three collection periods. The difference between home and school samples noted in year 1 were not noted in year 2. The NSS data suggest that the subjects transferred their fluent speech to the home and school settings as measured by this sampling process.

The length of sample, talk time and percent talk time of the NSS home and school for the three collection periods are shown below:

Sample NSS	Period and Measure								
	1			2			3		
	Talk Time	Total Time	Per-cent	Talk Time	Total Time	Per-cent	Talk Time	Total Time	Per-cent
Home	4.6	9.2	54.7	4.7	10.6	47.7	4.8	8.9	55.8
School	4.6	11.2	46.5	4.8	10.6	48.1	4.5	9.3	47.8

These data suggest that the NSS process was more efficient during year 2 than in year 1, especially for the school samples. The talk time percentage was generally around 50 percent for all NSS in year 2 as compared to 50 percent in the home NSS and 15 percent for the school NSS in year 1.

Comparison of NSS, CT and SI.

A comparison of NSS, SI and CT is shown below:

Sample	#1 (N 24) SW/M	WS/M	Per-cent	#2 (N 23) SW/M	WS/M	Per-cent	#3 (N 19) SW/M	WS/M	Per-cent
NSS-Home	7.4	104.8	7.1	3.7	119.8	3.1	1.4	128.0	1.1
NSS-School	7.9	112.3	7.0	4.4	122.7	3.6	1.5	128.6	1.2
SI	8.0	109.4	7.3	4.2	119.9	3.5	1.0	134.7	.7
CT	7.5	112.6	6.7	1.3	98.9	1.3	.9	125.7	.7

This comparison indicated a great deal of similarity among the four samples of stuttering behavior with the exception of CT #2. The lowest SW/M rates were shown in the CT consistently, followed by the SI and the NSS, although the differences were minimal (.6 SW/M from the highest to the lowest).

The findings in year 2 were generally comparable to those of year 1 suggesting that the shorter more structured process of the year 2 NSS was as accurate. The same general trends of more stuttering occuring in the less structured NSS than in the CT or SI were repeated. One finding was not. The high WS/M rate noted in the NSS in year 1 was not seen in year 2 and must have been due to a counting process or statistical limitation. Whether or not the NSS process used in this study accurately represents the speaking performance of the subjects as they naturally talk in their environment is still not answered. Both processes were overt. Only a covert process which could then be correlated with the results of the overt processes will answer this question.

Interviews

Parent-Teacher Interview.

Interviews with each parent, teacher and subject were conducted before the Establishment Program started, after the Establishment Program and after the Transfer Program. The results of the parent-teacher interviews for the two groups (DAF and GILCU) combined are shown in Table 28.

Question one attempted to assess the parents' and teachers' awareness of the problem. Eleven teachers and 22 parents indicated awareness with ten parents using the word, "stutters." There were eight teachers who were unaware of the problem. Interviews #2 and #3 indicated little change except for the increase to nine teachers reporting none, or no speech problem.

Question two attempted to assess variability. Most parents and teachers reported that the stuttering behavior did vary although there was shift in the number of teachers on interview #3 to nine reporting no or same.

Question three asked for a rating of severity. There was an overall agreement noted between parents and teachers over the three interview periods although there were individual differences. A comparison of teachers and parents rankings and SI #1 scores revealed that the parents were more accurate. There was also a general shift downwards in severity with 25 parents and teachers reporting severity of 4-6 on interview #1 and 20 parents and teachers reporting severity of 1-2 on interview #3.

Question four attempted to assess avoidance behavior. The most common response was that the subjects did not avoid at home or at school. There was a decrease in the number of parents from interview #1 to interview #2 reporting avoidance.

Table 28

Parent - Teacher Interviews 1, 2, and 3

1. Does (child's name) ever have trouble talking? Tell me about it.

	NR*	Never Noticed	None, No	Does Not Talk Much	Yes and Explain	Yes and uses word, "stutters"
1						
Teacher		5	3	5	4	7
Parent		0	2	0	12	10
2						
Teacher		2	1	4	9	6
Parent		0	3	0	17	3
3						
Teacher		2	9	1	6	0
Parent		1	3	0	8	3

2. Is (child's name) speech better sometimes than others?

	NR	Do Not Know	No or Same	Yes	Yes and Explanation
1					
Teacher		6	4	9	3
Parent		0	1	16	7
2					
Teacher	1	2	1	15	3
Parent	0	1		17	5
3					
Teacher		0	9	8	1
Parent		1	3	8	4

3. How would you rate his talking problem on the following scale? (Show scale)

	NR	None 1	2	3	4	5	6	Severe 7
1								
Teacher	2	3	3	5	5	5	1	
Parent	0	0	3	7	5	8	1	
2								
Teacher		1	4	10	4	3		
Parent		0	4	8	4	6		
3								
Teacher		6	4	5	2	1	0	
Parent		4	6	4	1	0	1	

*No Response

Table 28 (continued)

Parent-Teacher Interviews 1, 2, and 3

4. Does (child's name) ever avoid talking?

	NR	No	No and Explanation	Yes	Yes and Explanation	Does Not Talk Much, Shy
1						
Teacher	1	15	7	2	2	2
Parent		11	2	9	2	0
2						
Teacher		12	2	3	5	0
Parent		13	2	2	3	0
3						
Teacher		12	4	2	1	0
Parent		9	3	2	2	1

5. What do you do to help (child's name) talk better? (May give more than one answer)

	NR	Nothing	Listen	Talk to Reduce Child Pressure	Speech Advice	Encourage Talking	Attitude Advice	Control Others
1								
Teacher	1	10	6	3	1	5	1	2
Parent		7	1	4	8	2	1	2
2								
Teacher		6	7	5	0	11	1	2
Parent	1	8	6	1	6	4	2	1
3								
Teacher		4	9	3	1	5	0	0
Parent		3	6	1	3	3	0	1

6. Ask on first interview only. What do you think causes (child's name) talking problem? (May give more than one answer)

	NR	Do Not Know	Parents and Home	School	Pressure	Person-ality	Other Problems	Specific Events
1								
Teacher	1	13	2	0	4	4		
Parent		7	2	0	6	3	2	7

Table 28 (continued)

Parent-Teacher Interviews 1, 2, and 3

7. Ask on first interview only. Does (child's name) have other kinds of problems? (May give more than one answer)

	NR	No None	No and Explanation	Yes	Yes and Academic	Yes and Social	Yes and Personal
1							
Teacher		10	1	2	5	3	4
Parent		14	0	3	0	5	3

8. Ask only on first interview. Has (child's name) speech ever improved or been better?

	NR	Do Not Know	No or Same	No Worse	Yes Better	Yes and Explanation	Varies
1							
Teacher	2	13	1	1	0	4	2
Parent		1	2	3	9	5	4

9. Ask only on second and third interviews. Have you noticed any changes in (child's name) speech or other behavior? Tell me about them.

	NR	None	None and Explain	Speech Little	Speech Some	Speech Much	Yes Talk More	Yes Imp Aca.	Yes Imp Soc.	Yes Imp Att.
2										
Teacher	2		1	0	9	2	5	0	4	2
Parent	2		2	3	4	9	2	1	1	3
3										
Teacher	4				1	11	3	1	2	2
Parent	1				6	8	0	0	3	2

10. Ask only classroom teacher. How would you rate (child's name) on his amount of talking in the classroom compared to other children? (Show scale)

	None 1	2	Average 3	4	Much 5
1					
Teacher	3	7	9	3	2
2					
Teacher	1	7	9	4	1
3					
Teacher	0	4	9	5	0

Question five attempted to ascertain how much help was given the subjects by their parents and teachers. The common response was "nothing" for interview #1 except that eight parents said they gave "speech advice." There was a large increase by teachers (11) in interview #2 for "Encourage talking." In interviews #2 and #3 there was an increase from #1 for both teachers and parents in the number reporting "listen" as a method of helping.

Question six probed causation. Teachers (13) generally did not know. Parents were equally divided among "did not know," "pressure," and "specific events" (7, 6, 7, respectively).

Question seven sought information about other problems the subjects might have. The majority of parents and teachers (24) reported none. Seven teachers and eight parents reported social and personal problems. This was consonant with the case history results.

Question eight attempted to explore the previous history of the stuttering. Teachers did not know the subjects well enough to respond (13 "did not know"). Eighteen parents out of 24 reported variability implying that the child had been better or worse before.

Question nine sought information on improvement noticed by the parents and teachers. There were 27 parents and teachers who reported improvement in speech in interview #2 and 29 parents and teachers who reported improvement in speech on interview #3. There was some indication of reported improvement in other areas such as social and attitude on the later interviews.

Finally, question ten was to assess the amount of talking done by the subjects in the classroom. These results suggest a rather normal distribution over the three periods with the extremes omitted in interview #3.

The results of the parent-teacher interviews generally tended to agree with the more objective measurements of the project. The parents and teachers were generally aware of the subjects' problem and noted the improvement made by the subjects. Both parents and teachers were still reporting speech problems in interview #3 which may actually reflect the subjects' speaking or be a residue from the inital evaluation that the subject was stuttering, hence had a reputation as a stutterer so that any disfluency would be noticed. Objective measurements indicated that both whole-word and part-word repetitions continued to be demonstrated by the subjects in the last set of tests.

Subject Interview.

The results of the subject interviews are shown in Table 29. The subjects were interviewed by the project supervisor during the SI testing process. The subjects were asked questions, with some exceptions, similar to those asked their parents and teachers.

Table 29

Subject Interviews 1, 2, 3

1. Do you ever have trouble talking? Tell me about it.

	NR*	No	Yes, Described Other Speech Problem	Yes, Described Stuttering	Yes, Used the Word "Stuttering"
1		1	2	6	15
2		2	0	6	15
3		7	1	2	9

2. Is your speech better sometimes than others? Tell me about it. (May give more than one answer)

	NR	Do Not Know	No Same	Yes Morale	Yes Places	Yes Situations	Yes People	Yes, Not Nervous	Yes, Change Speech
1	1	2	1	1	2	4	9	9	3
2	0	0	1		3	2	7	7	7
3	0	0	4		1	3	5	5	5

3. Do other children or adults ever say anything about your talking? (May give more than one answer)

	NR	No	Others Ask	Children Tease	Adults give advice
1		9	2	8	4
2		11	3	7	2
3		8	6	1	4

4. Are there ever times when you do not talk even though you want to? (May give more than one answer)

	NR	No	Yes	Sometimes	Start and Stop	At Home	At School	Yes Other
1		6	11	6	2	4	5	
2		8	9	7	0	1	5	
3		9	4	0	0	1	3	

5. Are there things that you do to help yourself talk better? (May give more than one answer)

	NR	No	Think About What to Say	Slow Down	Do Not Talk	Practice Rehearse	Take Breaths	Stop and Start Over	Other
1	1	10	1	6	0	2	1	1	4
2		7	1	8	1	0	0	2	7
3		8	4	5	0	0	0	1	4

*No Response

Table 29 (continued)

Subject Interviews 1, 2, 3

6. Ask only on first interview. What causes your talking problem? (May give more than one answer)

NR	Do Not Know	Talk too Fast	Get Nervous, Excited	Forget Things	Specific Event
	15	4	7	1	1

7. Ask only on interviews two and three. What did you think of your speech training?

NR	Do Not Know	Did Not Like	Did Not Like But it Helped	Liked	Liked and it Helped
2		0	1	12	10
3		2	3	9	5

Question one was to probe awareness of the problem by the subject. There were 21 subjects on interview #1 who either described the problem of stuttering (6) or used the word, "stuttering" (15). Interview #3 indicated a shifting toward "no" (7), but the majority of the subjects (11) continued to describe a "stuttering" problem. Improvement in fluency did not guarantee that the subjects no longer thought of themselves as stutterers nor that they continued to think they had a stuttering problem.

Question two on variability did show throughout all three interviews that the problem varied a great deal from situations to places to people. The responses were fairly consistent over the three interviews.

Question three about others' reactions to the problem indicated a split between "no" response from others (9) to "asking, teasing" or "giving advice" (14). Two major shifts were reductions in "teasing" from Interview #2 to #3 and an increase in "others ask" in #3. The latter may have been due to the Transfer Program activities which called attention to the subjects' speech.

Question four was to probe avoidance behavior. Most of the subjects gave answers indicating avoidance (17). Their parents and teachers had generally indicated that the subjects did not avoid. There was a shift in interviews #2 and #3 (more in #3) toward less reporting of avoidance.

Question five was to probe for self-help activities. The most common responses in all three interviews were "No" (nothing) or "slow down." The increase in "Other" responses in interview #2 was due to a number of different responses such as "go to speech class, read, try not to stutter," etc. Only one subject said, "Use a fluent pattern."

Question six sought the subjects' comprehension of the cause of their problem. They were somewhat equally divided between "Do not know" (15) and "talk too fast" or "get nervous" (11).

Question seven attempted to probe for the subjects' personal reaction to the program. They almost unanimously (22 of 23 in interview #2 and 14 of 19 on interview #3) indicated that they liked the program and/or that it helped. The increase in "did not like" responses on Interview #3 was due to three junior-senior high school subjects and two elementary school subjects. To further probe liked and disliked activities the subjects were asked to list a specific like and a specific dislike. There was great variation in their answers. Answers on interview #2 (after establishment) pertained to the general therapy process such as "scheduling problems" or "having to get up early" to attend an early morning session. Only two subjects mentioned back-up reinforcers as "liked" items. Two subjects mentioned "monologue" and two more mentioned the DAF machine as disliked activities. Answers to the specific likes and dislikes on interview #3 also varied greatly. Six (five of which were junior/senior students) said that the speech in front of the

classroom was disliked.

Interview Analysis of 11 Subjects Who Passed CT #3.

A sub-analysis of the parent-teacher and subject interviews for the 11 subjects who completed the Transfer Program revealed very few differences from the total sample analysis. In the teacher-parent interviews proportionately more teachers reported improvement (questions 1, 2, and 3) and avoidance on interview #1 (question 4). Proportionately more parents reported improvement (question 3), specific causal events (question 6) and less personal problems (question 7). On the subject interviews more subjects reported no avoidance on interview #3 (question 4). In general, there were few interview differences between the 11 subjects who completed the Transfer Program and those who did not.

Clinician Interview.

The results of the clinician interview are shown in Table 30. All clinicians did not answer all questions.

Questions one through six dealt with various aspects of the project. In general, the clinicians viewed the project along the continuum from adequate to excellent. Lower ratings of fair and poor occurred most often in "change in child's speech" and tended to reflect those subjects who did not make dramatic changes in their speech, either because they were mild problems to begin with or did not make changes due to not completing programs.

Question seven attempted to evoke comments about the two Establishment Programs. Positive statements were generally ones like, "interesting for children," "easy to carry out," whereas negative statements were typified by statements like, "hard to get children to engage in monologue," or "lugging the DAF machine around is a pain." Most of the comments were different, although four clinicians stated that the program was easy to do. Most of the negative statements came from the DAF clinicians and reflected their problems with teaching pattern or some other facet of the program.

Question eight attempted to evoke comments about the Transfer Program from the two sets of clinicians. The positive and negative statements were somewhat equally divided between them. Actual statements varied greatly from clinician to clinician. The most common positive statement was that the Transfer Program was "strong, interesting and effective" whereas the most common negative statement was "troublesome to organize and carry out." Statements, both positive and negative, tended to reflect individual clinicians' experience in their own setting.

Table 30

Clinician Interview

Questions 1-6 How would you rate the following?

	Poor	Fair	Adequate	Good	Excellent
1. Training		1		1	10
2. Supervision			1	3	8
3. Establishment Program Per Child	3	2	5	4	10
4. Transfer Program Per Child		2	3	6	7
5. Change in Speech Per Child		5	1	6	9
6. Child's Response to Establishment	1		6	5	11
Transfer		2	3	3	9
Maintenance		2	1	1	7

Question 7: What three comments would you make about the Establishment Program?

GILCU		DAF		Total	
Pos	Neg	Pos	Neg	Pos	Neg
13	13	3	13	16	16

Question 8: What three comments would you make about the Transfer Program?

GILCU		DAF		Total	
Pos	Neg	Pos	Neg	Pos	Neg
5	13	7	6	12	19

Question 9: What three comments would you make about the Maintenance Program?

GILCU		DAF		Total	
Pos	Neg	Pos	Neg	Pos	Neg
6	4	0	4	6	8

Table 30 (continued)

Clinician Interview

Question 10: What was the hardest part of the programs for you to carry out?

Nothing	Stopping for Stuttering	Transfer in High School	Organization
1	3	2	3

Question 11: What was the easiest part of the programs?

Pattern	All	Establishment	Transfer & Maintenance	Reinforcing
1	1	6	1	1

Question 12: How would you change the training of clinicians?

None	Split Training of Transfer & Maintenance	More Counting Stuttered Words	Pattern
3	1	3	1

Question 13: How would you change the programs?

	Nothing	Step Changes	Written Instructions	Other
Establishment	3	2	1	3
Transfer	2	4		1
Maintenance	3			2

Question 14: What were the major problems encountered in running the:

	None	Scheduling	Child's Cooperation	Counting & Timing	Stopping for Stuttered Words
Establishment	1	2	1	1	1
Transfer	1	5	2		
Maintenance	3	1			

Table 30 (continued)

Clinician Interview

Question 15: How do these programs compare with other stuttering therapy you have done?

Had Done No Others	Other Different	Much Better
1	1	10

Question 16: Do you think the programs work?

Yes	Not Sure
11	1

Question 17: Do you plan to use the program next year?

Yes	No
12	0

Question 18: Rate your skills.

	Poor	Fair	Adequate	Good	Excellent
Counting SW	1		4	7	
Timing		1	3	5	3
Establishment			2	7	3
Transfer			6	4	2
Maintenance		1	1	3	3
Data	2	1	2	4	3
Criterion Tests			3	6	2

Question 19: Any other comments.

Monitoring Supervision	Positive	More Parent Teacher Involvement	Child Performance
3	5	3	2

Question nine concerning the Maintenance Program evoked mostly negative statements which centered around statements like "the program is too short," or "will the child really maintain?". Seven out of 12 clinicians reached the Maintenance Program, but most of them had not been on it very long.

Question ten indicated that either stopping a subject for a stuttered word or organizing the program (probably scheduling) was the hardest part of the Establishment Program.

Question eleven about the easiest part of the programs revealed that five clinicians believed Establishment was easier than Transfer.

Question twelve about improving the training indicated that the most important improvement would be in training to count stuttered words.

Question thirteen about changes in the programs themselves revealed that the clinicians as a group were fairly well satisfied with the programs as written except for minor changes in some steps or additions of activities such as "home practice."

Question fourteen indicated that for four clinicians scheduling the subjects had been a major problem. This reflected those clinicians who had to serve schools other than the ones to which they were assigned.

Question fifteen asking for program comparison indicated that at least ten of the clinicians thought the programs were better than what they had used before.

Questions sixteen and seventeen asked the clinicians for another evaluation of the programs. Ten clinicians were sure they worked and all 12 planned to use them again.

Question eighteen, which asked for a self-rating on various aspects of program conduction, indicated that most of the clinicians (ten) felt they were at least adequate in the skills with most ranking themselves as good or excellent. The major problem area was Transfer, but this was due to fact that some of the clinicians had not run the Transfer Program or had not completed it and may not have been sure of their skills.

The final omnibus question nineteen indicated that the clinicians felt good about the project and the programs. Some commented on how much they appreciated the supervision. Some commented on getting more parent-teacher involvement. Some commented on the subjects' improvement in speech.

An overall analysis of the results of the clinician interview was that

the clinicians viewed the project and the programs positively. They had seen changes in the subjects' speech behavior. They had found some problems with the DAF program and the Transfer Program. At the conclusion of the project they indicated that they felt competent in operating the programs and would use them again.

Miniature Delayed Auditory Feedback Apparatus

Most of the first part of year 2 was spent in getting the Mini-DAF operational. The major problem was battery leakage and recharging the unit. These problems were not solved until Spring, hence it was not possible to test the unit in the second year of the project. The unit is presently operational and will be tested.

Electric Counter

An electric counting device which had two switches (one for words counted and one for stuttered words counted) and three readouts (one for time in minutes and seconds, one for stuttered words and one for words counted which included stuttered words) was received in the Fall of 1973, and used in word counting. The equipment was extremely helpful in the stuttered word and word counting process.

Maintenance and Follow-up of Year 1 Subjects

The results of the Maintenance Program and follow-up on the four subjects from year 1 are shown in Table 31. All four subjects completed the Maintenance Program, but subject J.I. had to repeat 2 steps.

The first follow-up period (November) indicated that the four subjects were generally continuing their fluent speech although subjects B.C. and J.I. demonstrated increases in SW/M. The second follow-up period (February) showed subjects B.C. and J.I. increasing in SW/M again. The third follow-up period (May) demonstrated that subjects J.I. and B.C. were better but were still showing stuttered words.

All four of the subjects consistently did best on the SI videotaped sample, but varied on the home and school samples. Subjects J.R. and H.L. both demonstrated low rates throughout, although J.R. reported that he was having some difficulty when he was interviewed during the February follow-up. Subject B.C. did well on the SI and demonstrated mostly whole-word repetitions. Both her parent and teacher indicated on their interviews that she was still stuttering which correlated with the NSS data. Subject J.I. continued to present special problems in that his test performances (SI) were a good deal better than his NSS. He appeared to have the ability to speak very fluently and could do so, but often did not. Casual observation of his speech outside the test situation indicated that he was still noticeably

Table 31

Means and Standard Deviations for Talk Time Hours, Session Hours, Stuttered Words Per Minute (SW/M) During the Maintenance Program, Stuttering Interviews (SI), and Natural Speech Samples (NSS) in Home and School During the Three Follow-up Periods: November, February, and May, 1973-74 for 4 Subjects From Year 1.

Program and Subject	Maintenance			November Follow-up			February Follow-up			May Follow-up		
	Session Time	Talk Time	SW/M	SI SW/M	NSS-H SW/M	NSS-S SW/M	SI SW/M	NSS-H SW/M	NSS-S SW/M	SI SW/M	NSS-H SW/M	NSS-S SW/M
GILCU #4												
B.C.	2.0	.6	.2	.1	2.0	2.6	1.2	3.4	2.3	1.2	--*	3.3
H.L	2.0	.6	.2	.5	.2	1.4	1.1	1.2	.6	.4	.4	.6
J.R.	2.0	.6	.1	.2	0	.6	.7	0	0	.2	0	.2
Pause #3												
J.I.	2.5	.8	.4	.8	1.2	3.1	1.2	5.0	2.9	1.9	2.5	.4
Total												
M.	.7	2.1	.2	.4	.9	1.9	1.1	2.4	1.5	.9	1.0	1.1
S.D.	.1	.3	.1	.3	.9	1.1	.2	2.2	1.4	.8	1.3	1.5

* Lost

stuttering. If all of the data including the interview are collapsed and abstracted, it appears that subjects H.L. and J.R. have maintained their fluent speech and will not need further therapy, whereas subject B.C is questionable (her SW/M rate is low, and her stuttering consists mostly of whole-word repetitions) and subject J.I. definitely still stutters and needs further therapy. Viewed as a group, the four subjects continued their fluent speech throughout the follow-up period except for the slight increase during the February follow-up. These data indicate that although all four subjects continued in stuttering rates lower than their entrance rates in the Fall of 1972, additional maintenance and perhaps recycling or further training would have been necessary for at least two of them. These data are not enough to adequately answer the questions of either how well subjects maintain their fluent speech or how much Maintenance Program they need, but the data suggest that further Maintenance Programming with built-in recycles and retraining may be necessary for some subjects.

A second set of data was collected on six subjects from year 1. These subjects had failed either CT #2 or #3 (more than .5 SW/M) and had been dropped from the project. Two were from DAF, three from P.T. and one from P. They received no Maintenance Program during the summer of 1973. After receiving additional CT's they were put through the GILCU program. The results of the CT's for 1972-1974 and GILCU program run data for 1973-74 are shown below:

	CT#1 Fall 1972 SW/M	CT#2 Spring 1973 SW/M	CT#1 Fall 1973 SW/M	CT#2 Spring 1974 SW/M	Total Session Hours	Talk Time Hours	Talk Time Percent	Program SW/M
Mean	8.1	.8	2.2	.2	7.4	3.1	42	.4
S.D.	3.1	.2	.6	.1	6.0	2.7	5.6	.2

These data indicate that the six subjects tended to continue their reduced stuttering level for three months without therapy. Their rates did rise during that period, but were far below their pretherapy program rates of 1972. Their performance on the GILCU program was similar to that of the subjects of year 1 and year 2. The standard deviations for session and talk time hours were so high because one of the subjects (R.G.) took an unusually long time (19 hours) to complete the program. From these data it may be inferred that the changes brought about by three different programs used in year 1 continued with only a slight increase (a mean of 1.4 SW/M) for a three-month period. The subjects were able to go through a second, different program and succeed. By the end of the school year the six subjects were in various phases of the Transfer Program and doing well. Three

other subjects from year 1 who had not met criterion on CT #2 in the spring of 1973, indicated rates that were equal to their entering rates.

All of the follow-up data have one thing in common, the persistance of low rates of stuttering behavior which were noticeable to other people such as parents, teachers and clinicians. This could be explained by the topography of stuttering (subjects were improved, but continued to show whole-word repetitions which could be defined as normal disfluencies) or the criterion levels of the program were not low enough which resulted in the persistence of stuttering behavior, albeit at low rates, over long time periods.

Subjective Observations of Child, Program and Clinician Performance

During the two years a number of casual, subjective observations were made by the project staff. Some of these have been supported already in this report with measurement and data. Some have not. For whatever value they may have, they are shared here.

Child.

The children in the project appeared to be relatively normal children who also stuttered. Only a few obvious behavior problems were seen and they managed to get through the programs although in some cases, they took much longer and one subject was dropped. Their overall severity (a mean of 7.0 SW/M) was constant over the two-year period. Most of them were in the mild to moderate severity category. Most of them were aware of their speech problem. Most of them liked the programs (only 3 dropouts out of 40 and one of these was questionable). Most of the children demonstrated important improvement in their speech (we count only one clear-cut failure in year 1, O.J.; and one failure in year 2, D.M.). Post program interviews commonly indicated that for all the subjects both they and their parents reported "stuttering." Does this reflect the history or label of stuttering or does it accurately indicate remaining stuttering which is not apparent in the formal post tests and samples?

Program.

All four of the Establishment Programs generally ran well with only minor problems. The major problems were in providing a clear description of the task required by the clinician (the P.T. program, for example) and establishing reasonable criterion levels (especially for the P and P.T. programs). The Transfer Program was hard for the clinicians to carry out mainly because it required involvement of many other people, hence interaction with them and a great amount of organization. The talking time yield per clinical therapy hour in the Transfer Program was only 30 percent. This does not measure the amount of time needed by the clinician for extra program organizational activities. Consequating stuttered words "publicly" in the Transfer Program is another problem.

A major concern is that of appropriate criterion levels. The target of the fluency programs is normal, human speech, which is defined as speech at normal rates (120-140 words per minute) which is free from stuttered words. Most of the subjects reached the word rate level, but still persisted during final tests in stuttering at some rate, usually between .1 and 1.0 SW/M. Most of these stutterings were whole-word repetitions which are common in the speech of non-stutterers. The programs are set to run at .5 SW/M (including whole-word repetitions). Given an accurate count by the clinician this criterion appears to be reasonable, but many of the subjects and their parents still reported stuttering. How much fluency and for how long must an "ex-stutterer" demonstrate fluency before he and his environment consider him a normal speaker.

All four Establishment Programs were basically quite similar. They all contained some form of consequence (punishing, usually) for stuttering and reinforcement for fluency or modified fluency. The more efficient programs (DAF and GILCU) tended to increase the probability of fluency, hence positive reinforcement for fluency.

One final concern is that we had had the most previous experience with the GILCU and DAF programs (Ryan and Van Kirk, 1971). This undoubtedly biased our results to some extent.

Clinician.

The clinicians generally did well demonstrating that public school speech clinicians can carry out the programs in the public school setting. The basic skills of programmed therapy are not difficult to learn. The major problems were scheduling, counting stuttered words and "sticking to the program." The scheduling problem is not a new one in the public schools. It was aggravated in this project due to the necessity of clinicians going to schools they did not normally serve which required extra effort from them to set up Transfer Program activities. Most public school clinicians are not used to doing therapy in other settings such as the classroom and home.

The problem of counting stuttered words has been discussed before in this report and that previous discussion will not be repeated. Our observation is that the clinicians did not want to count stuttered words or had difficulty attending to the task which required high vigilance with few countable responses. Their lack of desire to count stuttered words seemed to stem from "not wanting to hurt the child" or to "impair their relationship with the child" which in turn came from their training that "stutterers" are different, emotionally disturbed and direct confrontation of the stuttering may lead to more stuttering. This problem becomes more pronounced as the clinician moves the child into and through the Transfer Program because the Transfer Program is a public performance which is difficult to arrange and a situation in which it is even more difficult to indicate his errors to the child.

A final observation is that programmed fluency therapy is "hard work" even without the extra tasks involved in this project such as collecting NSS. The data suggest that the results are worth the effort. The programs require constant vigilance and "on-line" activity by the clinician. The programs require extensive interaction with parents and teachers. Some of the clinicians had the motivation and skills to carry out the procedures and some did not.

In the final analysis of this project it is obvious that the measurement of the outcome must reflect the inter-action among child-program-and-clinician. Children with mild to moderate stuttering problems will do well on any of the four programs, if the clinician runs the program correctly. The programs actually are quite similar. Children with severe problems are more efficiently served by the DAF program. Clinicians are capable of running the programs (the programs actually are not difficult to operate) if they can teach pattern (DAF program), consequate stuttered words accurately and consistently and if they have the inter-personal and organizational skills necessary to manage the Transfer Program. Training usually can provide for only a limited number of these skills and most training is related to actual program operation. Fortunately, most of the school-age children who stutter are in the mild to moderate range and most of the clinicians have had or have been able to develop with training the necessary skill to operate and organize programmed fluency therapy. We knew all the programs would work (Ryan, 1971; Ryan and Van Kirk, 1971; 1974; and Ryan, 1974). What we did not know was all the variables involved in teaching others how to run them. We learned a great deal of information about that from this project.

SUMMARY

The two Establishment Programs (GILCU #4 and DAF #2) were run on 24 children by 12 speech clinicians in three different public school settings. The one Transfer Program was run on 20 subjects who had completed one of the Establishment Programs. The Maintenance Program was run on 11 subjects who completed the Transfer Program. Pre and Post tests (CT and SI) were given to the subjects. Samples (NSS) were collected of the subjects' speech in their home and school environments. The testing and the samples were taken before Establishment and after Establishment and after Transfer. These test data were analyzed in terms of stuttered words per minute (SW/M), words spoken per minute (WS/M) and percent of stuttering. Numerous reliability probes were conducted on counting stuttered words, total words spoken and timing talking. The programs were analyzed in terms of total sessions hours, talk time hours (subjects' actual talking time) and percent of talk time (talk time divided by session time expressed as a percent). Clinician performance was measured by various tests and observations throughout the year. All subjects, their parents and teachers, and clinicians were interviewed at various phases in the year. These data will now be applied to meeting

the purposes of the second year of the project:

1. Compare Two Programs (GILCU and DAF) for Establishing Fluency

The two programs ran quite similarly. Both produced similar major improvement in speech fluency in equal time periods (7.8 hours for GILCU and 8.0 hours for DAF). The DAF program was more effective with more severe subjects. Eleven of 12 subjects finished the DAF Program whereas only nine of 12 finished the GILCU Program. These latter three subjects were moderate to severe stutterers. Severity is an important factor in the GILCU Program.

There were more recycles and branching in GILCU. The GILCU Program produced better generalization at the end of the Establishment phase. Initial correct pattern training was critical to the success of the DAF Program. DAF subjects who were not patterned correctly had difficulty completing the Establishment Program and/or the Transfer Program. Inaccurate counting, hence consequation, of stuttered words was responsible for much of the variation in the performance of both programs.

2. Collect Additional Data on the Operation of the Transfer and Maintenance Programs

The data indicated that 19 subjects from DAF and GILCU did perform differently from each other during the Transfer Program. The DAF subjects took on the average almost 2 hours longer to complete it and four DAF subjects could not pass CT #3. The Transfer Program was demonstrated to produce additional changes in extra-program fluency especially for the DAF subjects. Analysis revealed that the Transfer Program, to be most effective, should be run within reasonable (11 weeks) calendar time periods. Those subjects who were run over longer time periods either had to recycle or were unable to pass CT #3. Inaccurate counting, hence consequation, of stuttered words was responsible for most of the program variation.

Based on the procedures and data from this project there is no way to predict the need for or Transfer Program performance except the observation that young and/or mild stutterers demonstrate better generalization.

The minimal data collected on the Maintenance Program make it difficult to completely evaluate that program. Tentatively, it appears that the Maintenance Program provided for both maintenance and check-ups of the fluency achieved by the 11 subjects who completed the Transfer Program and passed Criterion Test #3.

3. Test a Revised Natural Speech Sample (NSS) Process

The revised Natural Speech Sample process was more structured,

taken less often during the second year of the project, and was more efficient. There was much less variation between it and the other test measures in year 2 than in year 1. The process served the purpose of the measurement of generalization. The findings generally were the same as in the first year concerning the lack of generalization for the DAF subjects after completion of the Establishment Program and the consistent higher rate of stuttering in the NSS than in other measures (however, the subject performances in NSS #3 and SI #3 were very similar). The NSS process reflected the improvement in fluency brought about by the Transfer Program. Subjects who finished the Transfer Program generally did better than the subjects who did not. It was possible for the clinicians to collect both NSS school and home samples with parent and teacher cooperation.

4. Collect Additional Data on the Clinicians' Ability to Carry Out the Programs in the Public School Setting

Both the initial training program and the mointoring-supervising process were improved, objectified, and provided data about clinician performance in year 2. These data suggest that the clinicians were able to learn to run the programs with training and supervision. The most sigificant data to measure this was subject performance. Twenty-one of the 24 subjects made measurable major improvement in speech fluency, one subject made only minor improvement, one subject dropped out before testing, and one subject was virtually unchanged. The most significant predictive factor of success during the workshop training period was clinician performance in practicum. This was not objectively measured. Monitoring revealed that the clinicians tended to operate the programs better when the supervisor was there, but still tended to operate at about 81 percent accuracy throughout all program operation. The most common clinician problem was the under-counting of stuttered words during program steps. Unfortunately, this is an extremely crtical event in the success of the programs. The reason for this problem seemed to be a reluctance to stop the subject for stuttering rather than an inability to detect stuttered words. Simple, corrective feedback by the project supervisor improved this performance, but inaccurate, under-counting was persistent and represented most of the clinicians' errors, hence subject and program failure.

CONCLUSIONS FROM THE TWO-YEAR STUDY

Based on the data and observations collected over the past two years the following conclusions appear warranted:

1. All four programs (GILCU, DAF, P and PT) were demonstrated to reliably produce improved fluency in a wide range of children who stuttered in a reasonable time period (approximately 10 hours). The improvement appeared to be relatively stable.

2. The GILCU and DAF programs were more efficient than the other two programs (approximately eight hours of training).

3. The DAF program is more effective than the GILCU program with severe stutterers.

4. The completion of any one of the Establishment Programs produced improvement in extra-program fluency with the exception that the improvement was not as great for the DAF Program subjects.

5. The completion of the Transfer Program provided for still further improvement in extra-program speech fluency, especially for the DAF subjects.

6. The Maintenance Program has value in helping the subjects continue in their fluency.

7. With appropriate training (15 hours) and supervision (10 hours per clinician) speech clinicians in the public school setting can learn to run the programs accurately.

8. The speech clinicians' major problems in Establishment Programs concerned the correct teaching of pattern in the DAF Program and undercounting stuttered words in all programs. The latter appeared to be a problem of attitude rather than of ability.

9. The speech clinicians' major problem in the Transfer Program was completing it in a reasonable amount of time. The problem appeared to be an organizational one rather than an inability to operate the program per se.

10. Interviews conducted of the subjects, their parents and teachers and the speech clinicians generally correlate with the other data of the project. The one exception is that parents and subjects continued to use the word, "stuttering," in reference to the subjects' speech even though the objective data indicated great improvement and in many cases, normal fluency.

11. Programmed fluency training is an efficient and effective method for increasing fluency in school-age children who stutter.

BIBLIOGRAPHY

Goldiamond, I. (1965) Stuttering and fluency as manipulatable operant response classes, in Krasner, L. and Ullman, L. (Eds.), Research in Behavior Modification. New York: Holt, Rinehart and Winston.

Ingham, R. and Andrews, G. (1973) Behavior therapy and stuttering: a review, Journal of Speech and Hearing Disorders, 38, 405-441.

Martin, R. (1968) The experimental manipulation of stuttering behaviors, in Sloane, H. and MacAulay, B. (Eds.), Operant Procedures in Remedial Speech and Language Training. New York: Houghton-Mifflin.

Rickard, H., and Mundy, M. (1965) Direct manipulation of stuttering behavior, an experimental-clinical approach, in Ullmann, L. and Krasner, L. (Eds.), Case Studies in Behavior Modification. New York: Holt, Rinehart and Winston.

Ryan, B. (1970) An illustration of operant conditioning therapy for stuttering, in Fraser, M. (Ed.), Conditioning in Stuttering Therapy: Applications and Limitations. Memphis: Speech Foundation of America.

Ryan, B. (1971) Operant procedures applied to stuttering therapy for children, Journal of Speech and Hearing Disorders, 36, 264-280.

Ryan, B. (1974) Programmed Therapy for Stuttering in Children and Adults. Springfield: Charles C. Thomas.

Ryan, B. (1964) The construction and evaluation of a program for modifying stuttering behavior, unpublished doctoral dissertation. Pittsburgh, University of Pittsburgh.

Ryan, B. and Van Kirk, B. (1971) Programmed Conditioning for Fluency: Program Book. Monterey: Monterey Learning Systems.

Ryan, B. and Van Kirk, B. (1974) The establishment, transfer and maintenance of fluent speech in 50 stutterers using delayed auditory feedback and operant procedures, Journal of Speech and Hearing Disorders, 39, 3-10.

Siegel, G. (1970) Punishment, stuttering and disfluency. Journal of Speech and Hearing Research, 13, 677-714.

Siegel, S. (1956) Nonparametric Statistics for the Behavioral Sciences. New York: McGraw-Hill.

Skinrud, K. (1973) Field evaluation of observer bias under overt and covert monitoring, in Hamerlynck, L., Handy, L., and Mash, E. (Eds.) Behavior Change. Champaign: Research Press.

APPENDIX

STUTTERING INTERVIEW (SI)
FORM B
Upper Elementary Junior High Senior High Adult

Name: _____ Age: _____ Sex: _____

Tester: _____ Total: SW/M _____ Severity: 0 1 2 3 (circle one)

Date: _____ Reliability: _____ %

Time Sec.	Number of Stuttered Words	
		A.
		B.
		C.
		D.
		E.
		F.
		G.
		H.

Automatic:

1. "Count to 20".
2. "Say alphabet" or "days of week" or "months of year".
3. "Say a poem" or "the pledge of allegiance".
4. "Sing a song".

Echoic: (say after tester one at a time)

5. car man Ann goodbye paper interest stuttering amphibians cooperation specialization organizational representational constitutional some day the house into the car I can't find her. It's a good idea Yesterday it rained for hours.

Read: ("Amplifier" Passage[1] with 300 words or comparable passage)

6. "Read aloud".

Pictures: (any magazine)

7. Name 10 pictures.

Speak alone: (tester leaves room)

8. "Talk about anything" (1 minute).

Monologue:

9. "Tell me about recent T.V. program or movie you saw" (1 minute).

Questions:

10. "What is your name? Where do you work or attend school? What exactly do you do there? What does your father/husband do? What does your mother/wife do? How many are in your family? Tell me about them".
11. "Ask me five questions".

Conversation: (tester may take case history)

12. Tester engages in conversation with person about his speech; history of the problem, previous therapy, therapy goals, difficult speaking situations, other problems (3 minutes).

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Time Sec.	Number of Stuttered Words	
		I.
		J.
		Total

Telephone:

13. Place three calls.
Call airlines or bus lines. "What time does the _____ from _____ arrive.
Call a friend or relative and chat.
Answer a classified ad or call a store about a desired item. (total time 1 minute).

Observation in a natural setting:

14. Observe the person in conversation with someone other than the tester in a setting other than the test room. (3 minutes)
Location _____ Other person _____

$$\frac{\text{Total SW}}{\text{Total Time in minutes}} = _____, = _____ \text{ SW/M}$$

[1] Fairbanks, G. **Voice and Articulation**, New York: Harper Brothers, 1960, p. 114

NOTES:

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OE-2 Fluency Project
Session Monitoring Form

ician: _____ Date: _____

d: _____ Session#: _____

rver: _____ Program: _____

e_____ Live_____ Steps: _____

Counting Stuttered Words

1. Size of Sample: _____
2. Clinician Count _____ Observer Count_____ Reliability _____
3. SW counted by both: _____ Reliability _____
4. Notes: _____
_____

Timing

							Total
1. Step Number:	_____	_____	_____	_____	_____	_____	_____
2. Clinician time:	_____	_____	_____	_____	_____	_____	_____
3. Observer time:	_____	_____	_____	_____	_____	_____	_____
4. Discrepancy:	_____	_____	_____	_____	_____	_____	_____
5. Reliability:	_____	_____	_____	_____	_____	_____	_____

6. Notes: _____

Program Administration

1. Stimulus: _____
2. Consequation: _____
3. Step selection: _____
4. Recording errors: _____
5. Notes: _____
_____

OE-2 Fluency Project (continued)
Session Monitoring Form

Efficiency (Amount of child talk time)

1. % Talk time per session: _____

2. Notes: _____

Data

1. All Information Recorded: yes _____ error _____

2. Correct round off Time: yes _____ error _____

3. Correct calculation of SW/M: yes _____ error _____

4. Correct summary of session: yes _____ error _____

5. Score Sheet and Chart: _____

6. Notes: _____

mary:
ccuracy Score _____

	Counting	Timing	Admin	Effi	Data
Accurate Areas:	_____	_____	_____	___	___
Problem Areas:	_____	_____	_____	___	___